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ISSUE 2

A+ Apple II/Macintosh

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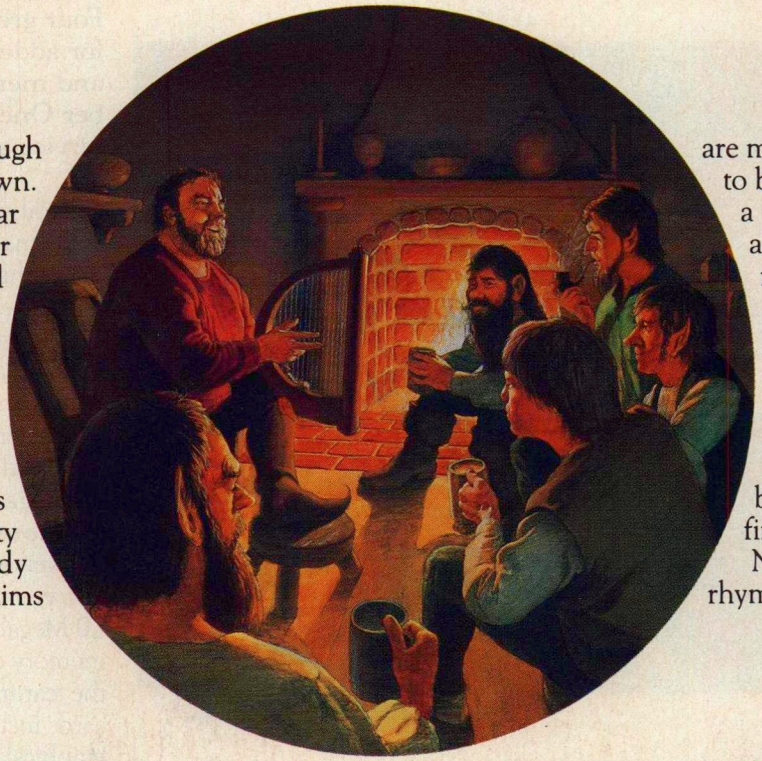

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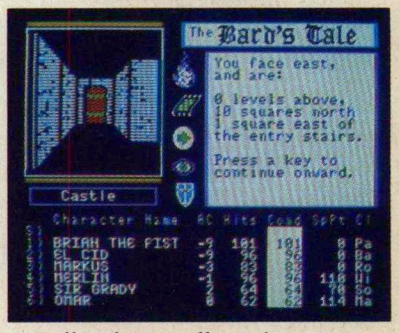

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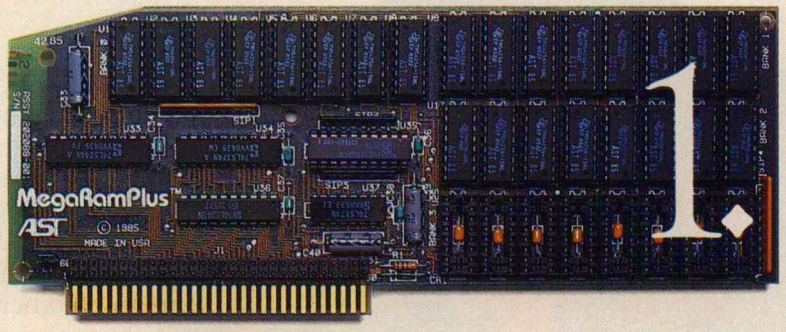

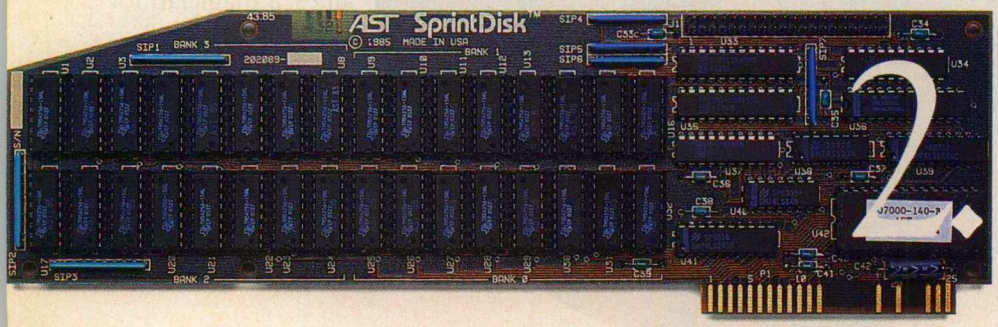

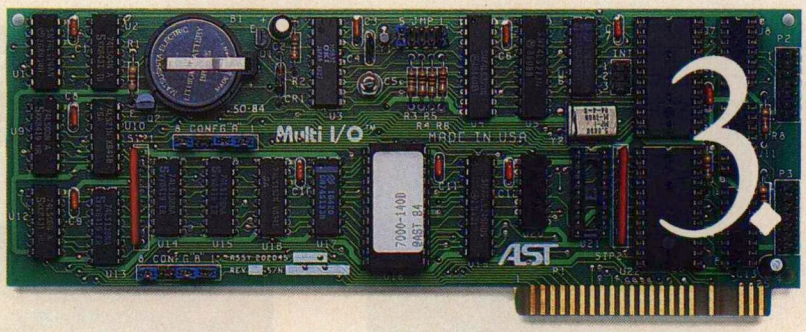

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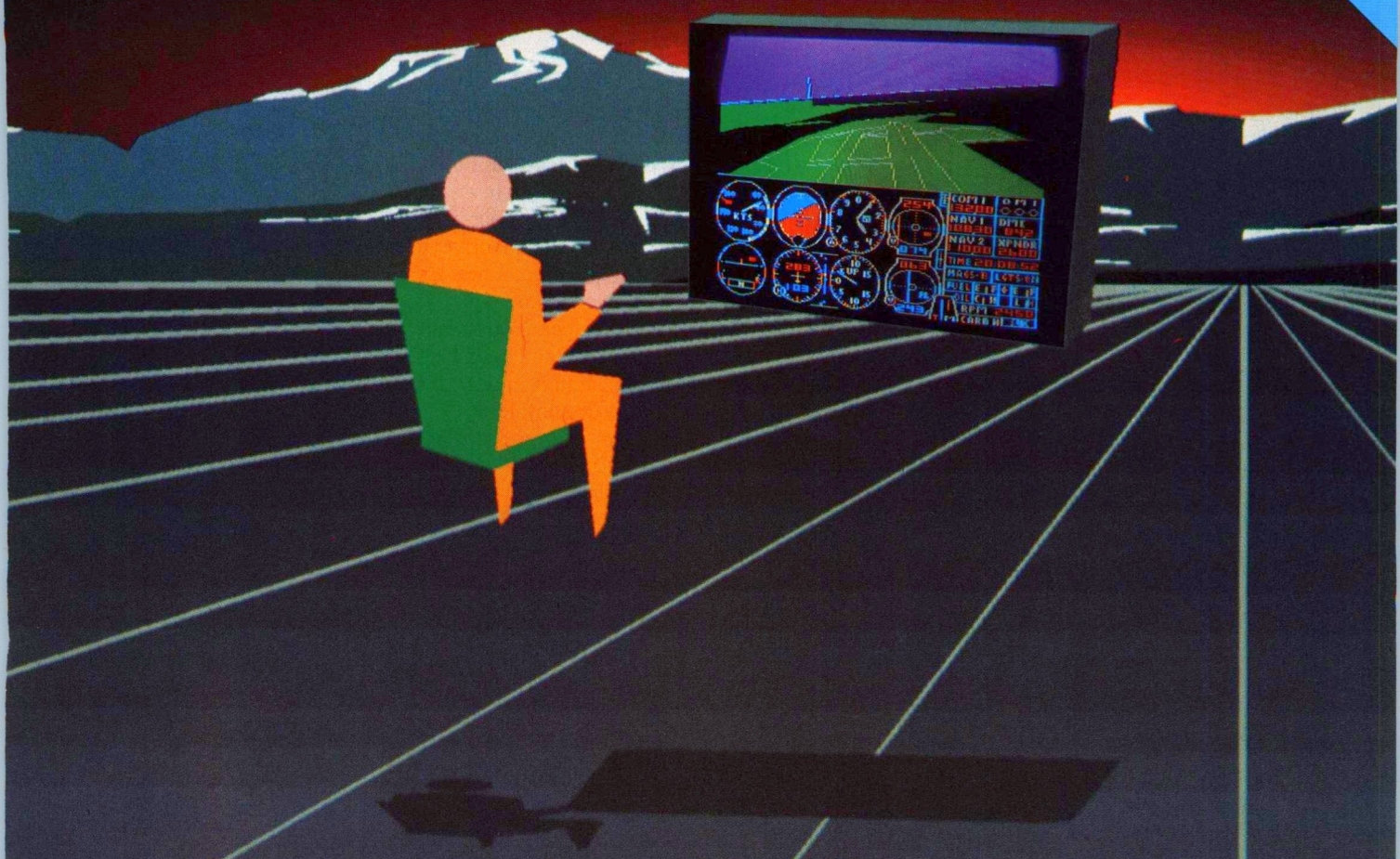

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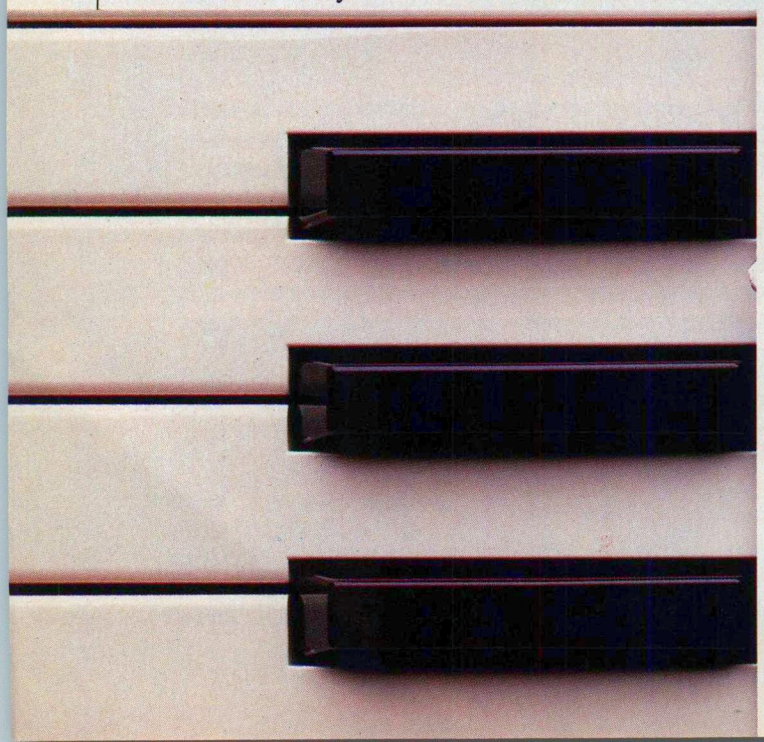

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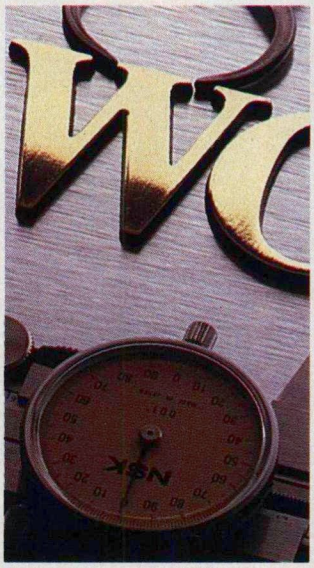

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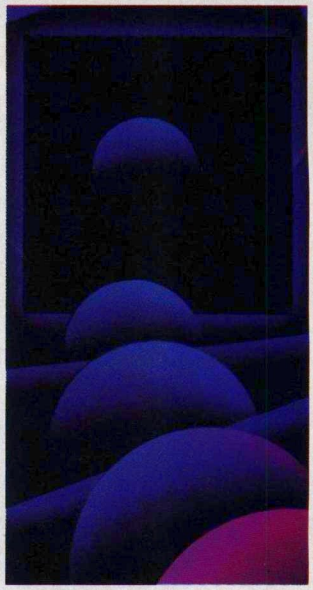

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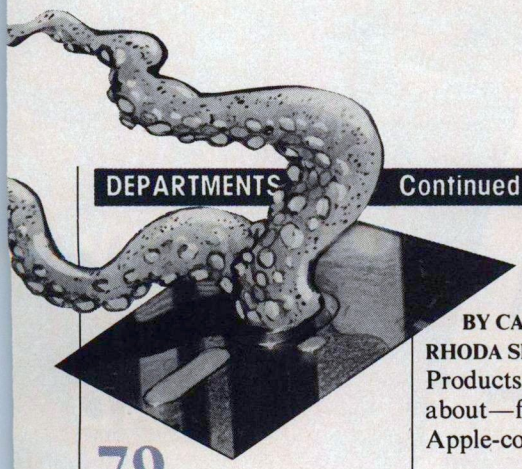

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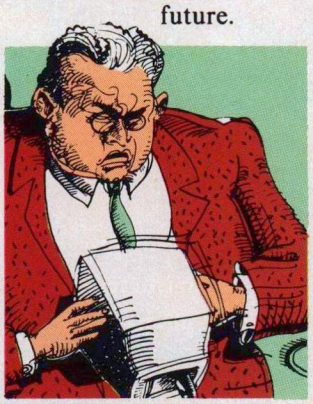

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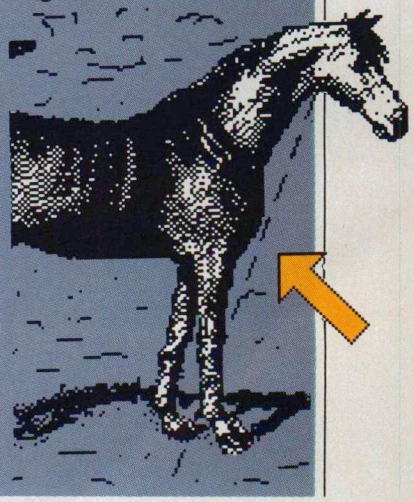

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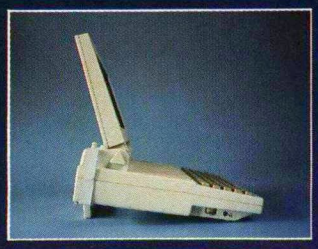

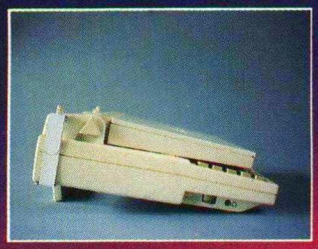

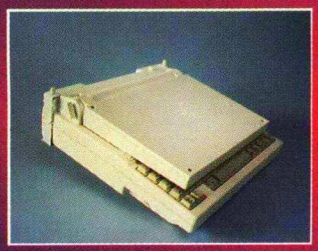

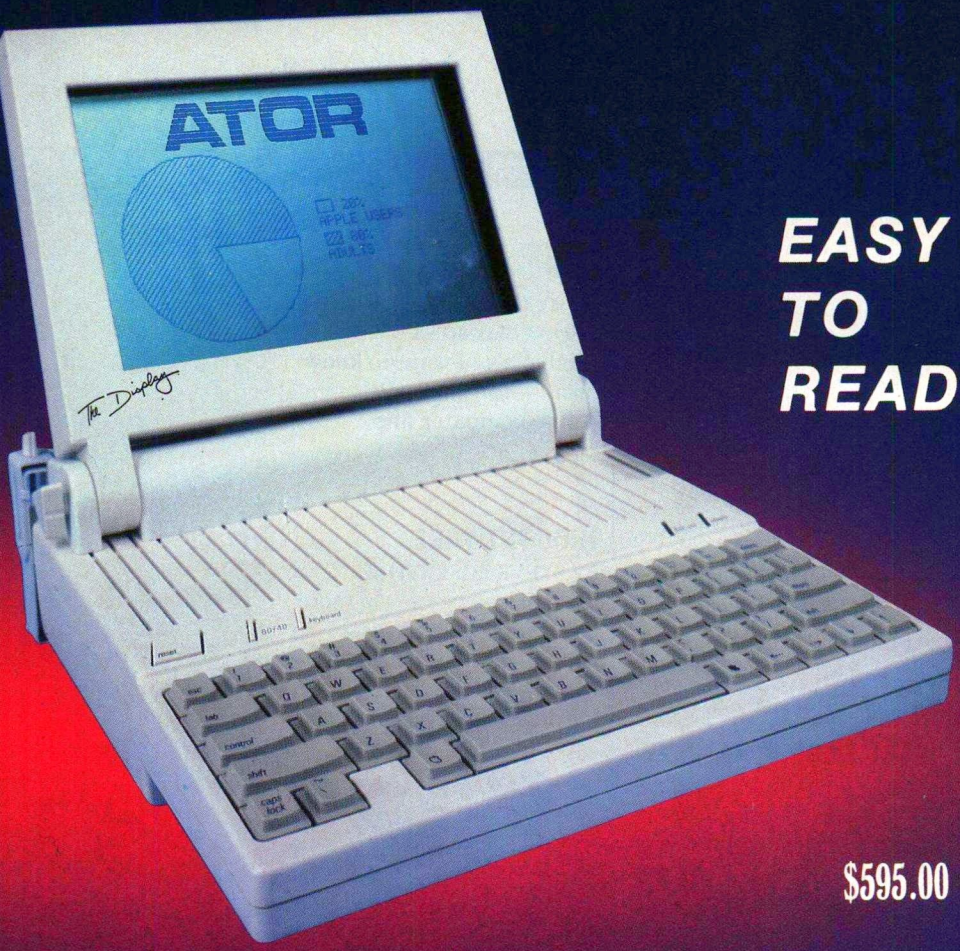

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Message from Maggie

With just a keyboard, a computer, and some software, musicians can virtually create their own orchestra, without having to know how to play each instrument.

THE MUSICAL WIZARDRY OF MIDI

Computers are changing the way everyone does business, from giant corporations to one-person shops, from accountants to entertainers. This month's four cover stories discuss how one such business, the music industry, is changing rapidly with the aid of computers.

The impact of personal computers on the electronic segment of the music business became evident a little over a year ago when professional musicians began adopting a standard method of communicating between instruments called MIDI, which stands for Musical Instrument Digital Interface. The standard was borne of a joint agreement between musical-instrument manufacturers, such as Roland and Yamaha, and computer manufacturers, such as Apple and Commodore, when they realized that computers and electronic instruments were increasingly being used together. Recognizing a potentially lucrative vertical market, these industries banded together in an effort to ensure success by creating a standard operating environment. This agreement was a particularly unusual move for the personal-computer industry, which has been plagued by a lack of standards.

Musicians use the MIDI interface, with appropriate software and hardware, to control the instructions that make sounds for sound tracks and special effects. Procedures that were once done by hand, such as setting volume, speed, and pitch, can now be automatically controlled by a personal computer.

Automating musical tasks brings several benefits to the music business. First, and probably most significant, is the cost savings that result from programming instruments with personal computers. Musicians can create multitrack recordings without expensive recording equipment and studio time.

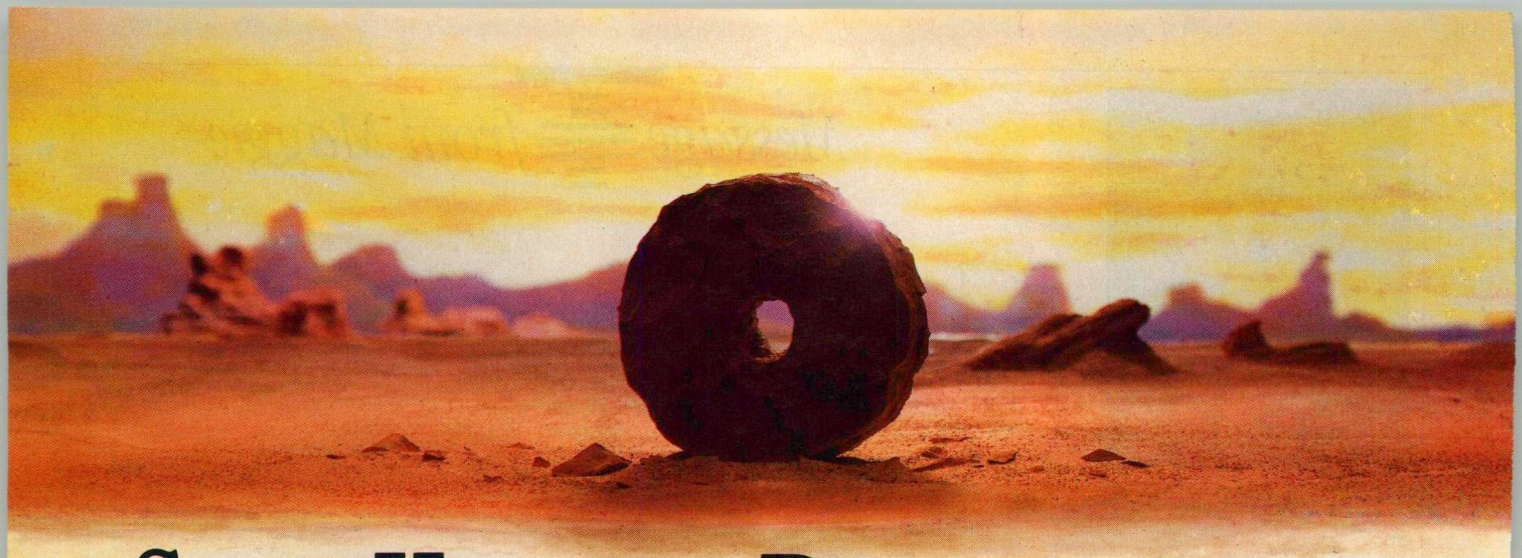
The other benefit of the union of personal computers and electronic instruments is the power the combination gives for endless creativity. With just a keyboard, a computer, and some software, musicians can virtually create their own orchestra, without having to know how to play each instrument. Imagination and the capacity for hard work are the only limits.

You may be wondering whether all this wizardry is only for professional musicians with deep pocketbooks. Well, as you will find in our cover-story articles, many products are available for both professionals and amateur musicians, so if you are a budding Bach or hankering to be a Herbie Hancock, be sure to take a look at our MIDI coverage.

One last point before I let you go enjoy this issue: We finally have our bulletin board set up and are anxious to have you participate. If you would like to talk to us via your computer, call (415) 474-8608 (300 bps). We look forward to hearing from you! ✚

Maggie Canon

MAGGIE CANON/**EDITOR IN CHIEF**

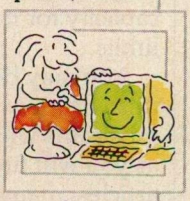


SOME HISTORIC BREAKTHROUGHS DON'T TAKE AS MUCH EXPLAINING AS COMPUSERVE.

But then, some historic breakthroughs could only take you from the cave to the tar pits and back again.

CompuServe, on the other hand, makes a considerably more civilized contribution to your life.

It turns that marvel of the 20th century, the personal computer, into something use ıl.



Unlike most personal computer products you read about, CompuServe is an information service. It isn't software. It isn't hardware. And you don't even have to know a thing about programming to use it. You subscribe to CompuServe —and 24 hours a day, 7 days a week, it puts a universe of information, entertainment and communications right at your fingertips.

A few of the hundreds of things you can do with CompuServe.

COMMUNICATE

EasyPlex™ Electronic Mail lets even beginners compose, edit, send and file messages the first time they get online. It puts friends, relatives and business associates—anywhere in the country —in constant, convenient touch.

CB Simulator features 72 channels for "talking" with thousands of other enthusiastic subscribers throughout the country and Canada. The chatter is frequently hilarious, the "handles" unforgettable, and the friendships hard and fast.

More than 100 Forums welcome your participation in "discussions" on all sorts of topics. There are Forums for computer owners, gourmet cooks, investors, pilots, golfers, musicians, you name it! Also, Electronic Conferencing lets businesses put heads together without anyone having to leave the shop.

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Our full range of games includes "You Guessed It!", the first online TV-style game show you play for real prizes; and MegaWars III, offering the ultimate in interactive excitement. And there are board, parlor, sports and educational games to play alone or against other subscribers throughout the country.

Movie Reviews keep that big night at the movies from being a five star mistake.

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THE ELECTRONIC MALL℠ gives you convenient, 24-hour-a-day, 7-day-a-week shopping for name brand goods and services at discount prices from nationally known stores and businesses.

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A to Z Travel/News Service provides the latest travel news plus complete information on over 20,000 hotels worldwide.

MAKE PHI BETA KAPPA

Grolier's Academic American Encyclopedia's Electronic Edition delivers a complete set of encyclopedias right to your living room just in time for today's homework. It's continuously updated ... and doesn't take an inch of extra shelf space.

The College Board, operated by the College Entrance Examination Board, gives tips on preparing for the SAT, choosing a college and getting financial aid.

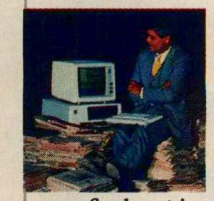
KEEP HEALTHY

Healthnet will never replace a real, live doctor—but it is an excellent and readily available source of health and medical information for the public.

Human Sexuality gives the civilization that put a man on the moon an intelligent alternative to the daily "Advice to the Lovelorn" columns. Hundreds turn to it for real answers.

BE INFORMED

All the latest news is at your fingertips. Sources include the AP news wire (covering all 50 states plus national news), the Washington Post, USA TODAY Update, specialized business and trade publications and more. You can find out instantly what Congress did yesterday; who finally won the game; and what's happening back in Oskaloosa with the touch of a button. And our electronic clipping service lets you tell us what to watch for. We'll electronically find, clip and file news for you...to read whenever you'd like.



INVEST WISELY

Comprehensive investment help just might tell you more about the stock you're looking at than the company's Chairman of the Board knows. (Don't know who he is? Chances are, we can fill you in on that, too.) CompuServe gives you complete statistics on over 10,000 NYSE, AMEX and OTC securities. Historic trading statistics on over 50,000 stocks, bonds, funds, issues and options. Five years of daily commodity quotes. Standard & Poor's. Value Line. And more than a dozen other investment tools.

Site II facilitates business decisions by providing you with demographic and sales potential information by state, county and zip code for the entire country.

National and Canadian business wires provide continuously updated news and press releases on hundreds of companies worldwide.

GET SPECIALIZED INFORMATION

Pilots get personalized flight plans, weather briefings, weather and radar maps, newsletters, etc.

Entrepreneurs use CompuServe too for complete step-by-step guidelines on how to incorporate the IBMs of tomorrow.

Lawyers, doctors, engineers, military veterans and businessmen of all types use similar specialized CompuServe resources pertinent to their unique needs.

And now for the pleasant surprise.

Although CompuServe makes the most of any computer, it's a remarkable value. With CompuServe, you get low start-up costs, low usage charges and local phone-call access in most major metropolitan areas.

Here's exactly how to use CompuServe.

First, relax.

There are no advanced computer skills required.

In fact, if you know how to buy breakfast, you already have the know-how you'll need to access any subject in our system. That's because it's "menu-driven," so beginners can simply read the menus (lists of options) that appear on their screens and then type in their selections.

Experts can skip the menus and just type in "GO" followed by the abbreviation for whatever topic they're after.

In case you ever get lost or confused, just type in "H" for help, and we'll immediately cut in with instructions that should save the day.

Besides, you can either ask questions online through our Feedback service or phone our Customer Service Department.

How to subscribe.

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Let's compare Apples™ to Apples™.

An Apple IIc

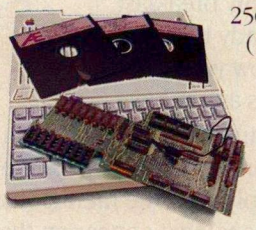
An Apple IIc with Z-RAM

The Apple IIc on the right works exactly the same as the Apple IIc on the left. Almost. The Apple on the right has a powerful memory expansion coprocessing card called Z-RAM. From Applied Engineering. Which means the Apple on the right can completely load AppleWorks into RAM—and then run it up to thirty times faster than the Apple on the left.

Z-RAM also acts as a solid-state disk drive. Which means the Apple on the right will load and store programs up to 30 times faster. And, our included RAM disk is compatible with Applesoft, PRO-DOS, DOS 3.3, PASCAL and CP/M.

Turbo Charged AppleWorks.

Even a 256K Z-RAM can completely load AppleWorks into RAM. With Z-RAM, the moment your fingers touch the keyboard AppleWorks responds. A 256K Z-RAM lets your IIc run AppleWorks up to 30 times faster, increases available desktop to 235K and maximum number of records from 1,350 to over 16,000, doubles the number of lines allowed in the word processor, provides a print spooler, and auto-segments large files so they can be saved on two or more disks. A 512K Z-RAM boosts AppleWorks desktop to an incredible 425K.



Take a closer look.

There's more. Z-RAM has a built-in high speed Z-80B microprocessor that allows you to run CP/M programs. Which means you now have access to the single largest body of software in existence, including popular packages like WordStar, dBase II, Turbo PASCAL and Microsoft BASIC. A 16 bit option is also available.

And still more. Z-RAM is compatible with all IIc software and hardware, installs easily in just ten minutes with a screwdriver (slightly longer without), is available with 256K or 512K of additional memory (a 256K Z-RAM can be upgraded to 512K at any time). Z-RAM is easily handled by the IIc power supply with our patent pending power saving design.

The only thing better than that would be a recommendation from Steve Wozniak.

> *"I recommend Applied Engineering products whole-heartedly." (Of course, Steve's IIc has a Z-RAM installed.)*
>
> *Steve Wozniak, the creator of Apple Computer*

For fast response.

Z-RAM comes complete with simple instructions, RAM disk software, Z-80 operating system, CP/M manual. And a five year "hassle free" warranty. Make a good Apple great. With 256K Z-RAM "384K total" ($359); with 512K "640K total" ($419); 16 bit option may be added later ($89).

If you want to run CP/M software, but don't need more memory, we suggest our Z-80c card. The Z-80c has no memory expansion ports and is priced at only $159.

Call 214-241-6060 TO ORDER TODAY. 9 a.m. to 11 p.m. Seven days, or send check or money order to Applied Engineering. MasterCard, Visa and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 outside U.S.A.

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Letters

We invite your comments.

PRONUNCIATION GUIDE

Dear A+: In "Space Trivia" (November 1985, page 142) you mentioned that the official pronunciation of *Halley* rhymes with *valley*. Whilst this version is definitely preferable to the more common *Halley* that rhymes with *Bailey*, the correct (British) pronunciation rhymes with *Horley* (or *Hawley*). This was confirmed by the chairman of the Halley's Comet Association during a recent interview on one of our national radio networks.

Mind you, try telling that to my three-year-old daughter, Hayley.

Joe Mitchell
London, England

FINDING HUMANFORMS

Dear A+: The September issue of *A+* presented an article by Roberta Schwartz and Michael Callery entitled "A Graphics Menagerie" that included a review of HumanForms. The Reference Corporation is no longer in existence, but System Peripherals has acquired the marketing and distribution rights to the package. In doing so, we have also lowered the price. You can obtain HumanForms by sending $49.95 plus $3.50 for postage and handling to System Peripherals, P.O. Box 126, Skillman, NJ 08558, or by calling (201) 874-4867 for VISA/MasterCard orders.

C.R. Hutchison
Vice President, Marketing
System Peripherals
Skillman, NJ

SONGPAINTER DEFENSE

Dear A+: I read with interest an article in the October 1985 issue entitled "Of Mice & Music" (pages 132–138). As one of the developers of SongPainter, a program mentioned in the article, I have some comments.

SongPainter is criticized because the patterns used to convey pitch have no "pattern." The resolution of the Macintosh makes it difficult to provide a gray scale to differentiate twelve pitches. Since pitches are relative and the goal of SongPainter is to encourage imaginative music composition, it was decided to use a combination of angled lines, dots, and crosshatch for the pitch patterns. This encourages an unconventional approach to composition.

SongPainter was never intended to be a music score writer. It is a novel piece of software to be used by nonmusicians for ear training and to explore their musical potential. It also gives experienced musicians a different perspective on composition.

Jim Monaco
Starcor
Austin, TX

PERSON-TO-PERSON

Dear A+: Thank you for the appreciative comments you made about our communications program Person-to-Person, Version 2, in "Modem Montage," *A+*, October 1985.

We would like to make one small clarification. You do not have to reconfigure the program to switch back and forth between 300 bps and 1200 bps. If your copy is already configured for a 1200-bps modem, the baud button in the Settings box offered by the Com Panel will toggle between 300 and 1200.

Also, our company's office address is 1700 Solano, Berkeley, CA 94707, and we can be reached by phone at (415) 525-4901.

Tom Marr, President
Trutec Software
Berkeley, CA

JUKI BUFFER UPGRADE

Dear A+: With reference to the Juki 6300 daisy-wheel printer, which you recently reviewed (October 1985, pages 56 and 59), it is easy and inexpensive to upgrade the text buffer from 3K (the way it comes) to 15K. This improvement allows the printer to accept about five pages of text and frees the Apple for other work while the document is printing.

To perform the upgrade, you must first remove the top cover. There are four Phillips screws, two on the top of the printer and two on the inside at the extreme right and left. Once they're removed, you can pop the cover off.

Locate chips 304 and 305 on the green CPU board at the right rear of the printer. These are 2K chips that need to be replaced by 8K chips. The replacement chips are TC 5565 (or 6264), which I was able to purchase from Taft Electronics at 68 West 45th Street, New York, New York for $15 each.

Remove the 2K chips and replace them with the 8K chips. You will also need to move the jumpers on the CPU board. The correct positions for the jumpers are numbers 3, 4, 7, and 8. Replace the cover, and you're in business.

Steven A. Seklir
New York, NY

CORRECTION

In our December 1985 issue, in the printer-interface list on page 45, we incorrectly gave the toll-free number of Practical Peripherals under SERIALL as (800) 991-8200. The correct number is (800) 641-0814.

IMPERFECT TABLE

Dear A+: We appreciate very much your mention of WordPerfect in your listing of word processors for the Apple II computer (November 1985, pages 36 and 37).

We did note a few errors in the table, however. The Apple II version of WordPerfect does have footnotes, background printing, and automatic

reformatting, and backup copies are allowed since the program is *not* copy-protected. The product does not have automatic index or table of contents or an automatic backup at this time. Again, thank you for the coverage in *A+*.

W.E. Pete Peterson
Executive Vice President
SSI Software
Orem, UT

We regret the reproduction error that led to the publication of incorrect information regarding WordPerfect.

DISTRIBUTION CORRECTION

Dear *A+*: It has been brought to my attention that in your November issue, on page 36 and 37, Micromation Limited is mentioned as the distributor for the Gutenberg word- and print-processing program. *This is incorrect.* Micromation has not been a distributor of Gutenberg Software since the end of June 1984.

Gutenberg Software Limited is distributing its own word-processing program to maintain better contact with users and to be able to provide better user support.

John Wagner
Gutenberg Software Limited
Scarborough, Ontario
Canada

SWYFTCARD REVISITED

Dear *A+*: Your SwyftCard review (November 1985, pages 86-90) was very timely. This product has barely hit the marketplace and is certainly getting lots of attention. Your banner, "SwyftCard makes an old dog—the Apple IIe—do new tricks," may offend many Apple IIe owners. The Apple IIe is not old, and it certainly is not a dog. To top it off, the SwyftCard hardly provides any new tricks. Text editing, communications, printing, keystroke shortcuts, and load/save of files have been around for years.

The SwyftCard does offer its limited functions in a small, convenient package. Reading Thornburg's rather enthusiastic review, one gets the feeling that he has never used anything better than the cryptic keyboard editor for Applesoft. All one has to do is use AppleWorks, Apple Writer, or Mouse Write to see what the "lowly" 6502 can do. These products do more for word or text-file processing than the SwyftCard will ever provide. The "lowly" 6502 was doing amazing things for years before the SwyftCard came along.

The SwyftCard's method of cursor movement is hardly new. Many editors use it on a single-character basis. What the SwyftCard provides in ability to create and edit a text document, it takes away by its inefficient use of disk space. Would you buy a 14-megabyte hard disk and then use a program that restricted use to only 4 megabytes? Well, that is what the SwyftCard does with a floppy (only 40K out of 140K). Worse yet, the rest of the space is lost to anything else, and the file cannot be used by anything else (without conversion).

The SwyftCard comes nowhere near the total performance of the word-processing program of AppleWorks, Apple Writer, or many other fine word-processing programs on the market. Moving the cursor, moving a paragraph, or saving a file is not the measure of performance of a word-processing program.

In today's world of Apple IIe computers, we are adding 2.5 megabytes of memory (RAMWorks II), connect-

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CIRCLE 309 ON READER SERVICE CARD

ing 10- to 30-megabyte hard disks, running 3.5-megahertz 65C02 processor speedup cards, using full-function integrated software, connecting to local-area networks, and installing 16-chip replacements (65802), and David Thornburg would like to have us believe that the SwyftCard is the best thing that has happened to his Apple IIe. This may be true for his computer, but I would not waste a valuable slot in my IIe for the very limited function provided by the SwyftCard.

I believe this product should have been given a few hard knocks in the review. Time gained in saving a few keystrokes will easily be wasted trying to get the documents to where they can be used. Or worse yet, it appears that only limited techniques are available to get existing data or information into SwyftCard documents for editing, transmitting, or printing (other than the school of hard knocks, via the keyboard; perhaps no keystrokes are saved here). If there is a technique, the reviewer failed to tell us about it. Speaking of printing, saving printer-control strings in the document went away with Apple Writer Version 1.1.

From the advertisement on page 207: "You've never seen an Apple IIe do word processing, filing, communicating and calculating the way it does with a SwyftCard." Quite frankly, I would not want to. It is too restrictive for practical use.

Ken Kashmarek
Eldridge, IA

The following is a reply to Ken Kashmarek from Jef Raskin of Information Appliance, maker of the SwyftCard:

I must agree with your comment that calling the Apple IIe an "old dog" is to slight its abilities. But with respect to the product being reviewed, the reviewer has the advantage: He has actually tried SwyftCard, and you have not, which may account for his enthusiasm and your lack of same. In terms of speed of operation and ease of use, Mr. Thornburg's statement that the SwyftCard outperforms any other Apple II word-processing system is certainly not challenged by any of the products that you mention.

Another point you make is absolutely correct: SwyftCard will *not* do what you can with a 14-megabyte hard disk or with gobs of expensive and relatively-hard-to-use software. But Detroit once made the mistake of thinking that everybody needed a few tons of electric accessories, chrome, and tail fins. Volkswagen, Toyota, Honda, and other makers of small, efficient cars made Detroit change its tune. I am sure you truly need all the equipment you've invested in, but there are probably a lot of us that just want to get simple tasks done easily and inexpensively.

Last, using "only" 40K on a disk so simplifies the human interaction and so minimizes the probability of error that we see it as a major advantage SwyftCard offers. I could (to present the other side of the coin) also ask what good is having megabytes of storage if making a simple error can wipe out hours or even weeks of work on it? For compact archival storage, we do provide a ProDOS converter so you can pack multiple SwyftCard texts onto a single diskette or even onto a hard disk.

Jef Raskin
Information Appliance, Inc.
Palo Alto, CA

T·H·E
HANDLERS

VALUE • POWER • SOPHISTICATION • SIMPLICITY

- The Handlers is a software package of three programs; word processing, file management and a spell checker for the Apple II, II+, IIe and IIc.
- The Handlers is *the* answer to programs that cost a lot, take a lifetime to learn and then don't deliver!
- The Handlers delivers the power and sophistication of large scale mainframe systems.
- The Handlers makes immediate sense to the beginner and the experienced computer user.
- More and more people are selecting the Handlers over Appleworks. *Why?* Because the Handlers beats Appleworks for power, ease of use and price! We took the difficulty out of the program when we engineered it so you get what you want out of the Handlers without wasting time.

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- 40, 66 & 80 column
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A truly fast & efficient file management program.
- Over 3,000 records per disk
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- Unlimited sorting fields
- Sorts alpha, numeric and date sorts
- Merges with word processors, create form letters
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- 90,000 words on one diskette
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CIRCLE 117 ON READER SERVICE CARD

FATTER
Than a Fat Mac

Checkmate Technology's MultiRam™ cards turn today's Apple //c and //e into powerhouse computers with a 1-2-3 punch!

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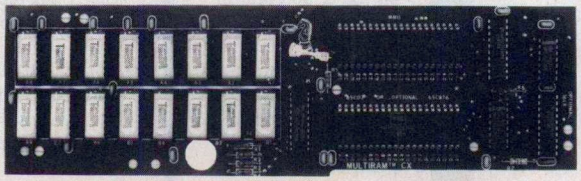
MultiRam™ //e memory cards add from 64K to 4 *megabytes* to the Apple //e — and RGB too! The MultiRam™ CX Card adds up to 512K to the //c for a 640K total. Plenty of memory for the most memory hungry programs.

MultiRam™ cards are designed to work with all hard disk drives, accelerator cards, the new Apple 800K UniDisk 3.5 drive, and other complementary hardware.

2. 16-bit processing power

Our 16-bit MultiRam™ //EX Card for the //e and the 16-bit CX Kit for the //c add a 65C816 CPU to the Apple with computational speeds 4 and more times faster than the standard Apple, the ability to directly address up to 16 megabytes of memory, and 100% compatibility with all of today's Apple software. Lots of processing power for the most complex integrated programs.



MultiRam™ CX

3. Programs for serious business

The two best selling programs in the world are AppleWorks and Lotus 1-2-3.

AppleWorks — Each MultiRam™ memory card comes complete with AppleWorks support. AppleWorks uses MultiRam™ memory to give you expanded Desktops of 425K on the Apple //c and over two megabytes on the Apple //e that shatter the old 55K Desktop limitation.

We even improve AppleWorks by allowing over 5,000 records in the database, show the date and time on screen and allow you to enter it into database records with one keystroke if a ProDOS compatible clock is in the computer, load all of the program into memory for lightning fast response, support popular AppleWorks accessory programs like Jeeves and Pinpoint, allow a RAM disk to be used with an expanded Desktop for switcher-like speed when moving between AppleWorks and programs on the RAM disk. And we're adding more features to AppleWorks all the time.

Apple, AppleWorks, MacIntosh, and ProDOS are registered trademarks of Apple Computer, Inc. / IBM is the the trademark of International Business Machines, Inc. Jeeves is the trademark of PBI Software, Inc. / Lotus 1-2-3 is the trademark of Lotus Development Corporation / MultiRam is the trademark of Checkmate Technology, Inc. Pinpoint is the trademark of Pinpoint Publishing, Inc. / VIP Professional is the trademark of VIP Technologies

More POWERFUL Than an IBM

Lotus 1-2-3? — Each MultiRam™ 65C816 option comes ready for business with VIP Professional, an integrated program identical in features to Lotus 1-2-3, the first program designed to take advantage of MultiRam™'s 65C816 power and memory. VIP Professional is 100% faithful to Lotus 1-2-3 standards — commands, graphics, database, macros and files are identical to Lotus 1-2-3. In fact, you can even transfer Lotus files from any IBM to your Apple, work with them, and transfer them back to the IBM. What's more, VIP Professional works as fast if not faster on the Apple than Lotus 1-2-3 does on the IBM.

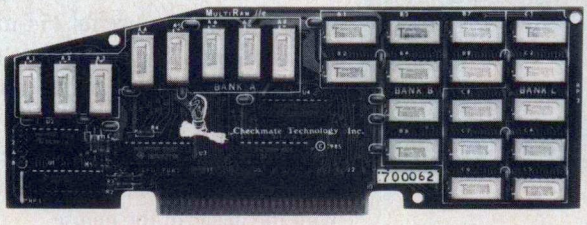
But you don't have to know Lotus 1-2-3 to use VIP Professional. MacIntosh style pull down windows, mouse support, on-line screens, and a thorough manual get you up and running in a hurry.

RAM Disks — Each MultiRam™ Card comes with ProDos and DOS 3.3 RAM disk software to turn MultiRam™ memory into huge RAM drives with speeds over 20 times faster than floppy drives. Copy programs to quickly save and load RAM disk information are included. For those who want to add their own RAM, each card also comes with a hi-res RAM test utility for easy RAM troubleshooting.

An enhanced, expanded AppleWorks, 16-bit VIP Professional, and RAM disks are but a few programs for the MultiRam™ family of peripheral cards that turn today's Apple into the Apple of tomorrow — a true business computer.

Great Prices

MultiRam™ cards are designed to be affordable because they're modular. Buy what you need now, and add on more memory or a 65C816 kit or card when you're ready. ■



MultiRam™ //e

MultiRam™ prices start at $159.95

Made in U.S.A. with a full 5 year warranty

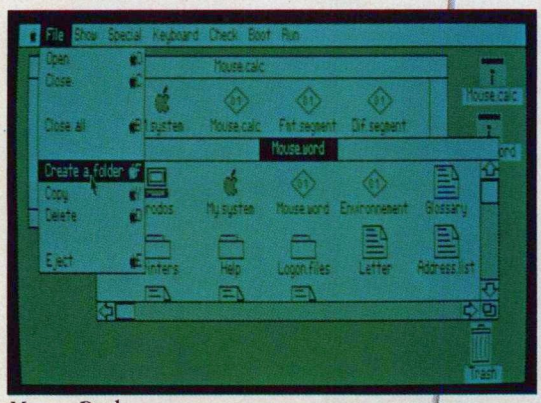
Ask your dealer for MultiRam™ today.

CIRCLE 128 ON READER SERVICE CARD

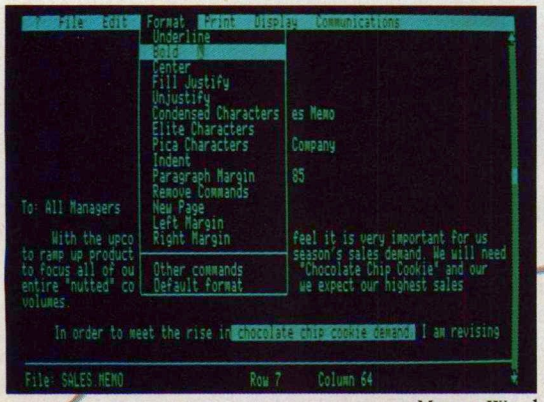
Checkmate Technology, Inc.

509 South Rockford Drive • Tempe, Arizona 85281-3021
™ (602) 966-5802 U.S.A. Telex: 165-025 CEC PHX
(800) 325-7347

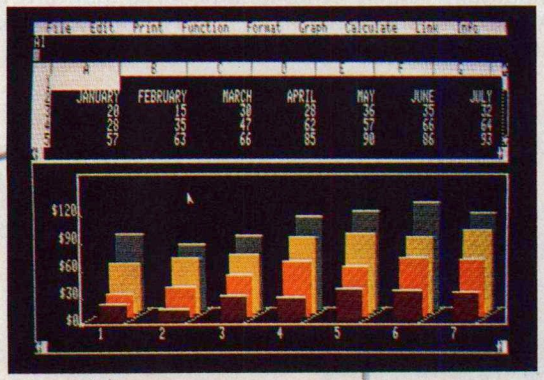
The Inside Line on the New Apple II



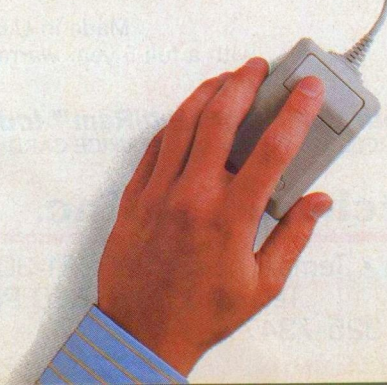
Mouse Desk



Mouse Word



Mouse Calc



Mouse Series:™ the *first* line of software to take full advantage of all the recent advances on the Apple II.

Because it's mouse-based, the Mouse Series brings to the Apple II all the convenient features of the Macintosh™ – icons, windows, pull-down menus... Everything is just a point and click away.

How to Switch Programs... Without Switching Disks...

With Mouse Desk,™ changing programs is like using remote control on a T.V. Use the mouse to switch quickly from program to program, or copy and delete files visually, by "dragging" icons.

Mouse Desk – the right choice, when you've got so much to choose.

How to Avoid the Draft...

With Mouse Word,™ make your first drafts final drafts. Quickly cut, paste, and boldface text with a simple point and click. Compose letters and reports, then get them into circulation fast with Mouse Word's mail-merge or communications options.

For unmatched power and ease of use, choose Mouse Word... the best word processor on the Apple II today.

How to Move Mountains of Data...

Mouse File,™ the newest Mouse Series program that gives you the power to push data around. Mouse File makes it easy to keep your important records *organized.* And lets you design reports visually, using the mouse and Mouse File's built-in design characters.

Put Mouse File on your shopping list – and put an end to data pushing you around.

How to Make a Worksheet Play...

With Mouse Calc, tasks like forecasting and financial projections become a snap. A powerful 254-row by 63-column spreadsheet, Mouse Calc is also easy to use, thanks to the mouse. Built-in color graphics lets you turn all your number-crunching into smashing charts and graphs.

Visit your authorized Apple dealer and get the inside scoop on our new, exciting line of Mouse Series software – the only Apple II software with the magic of the mouse.

Call or write: International Solutions
910 West Maude Ave.
Sunnyvale, CA 94086
(408) 773-0443.

CIRCLE 191 ON READER SERVICE CARD

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BY FREDERIC E. DAVIS

NewsPlus

New products, predictions, and the closest interface of all

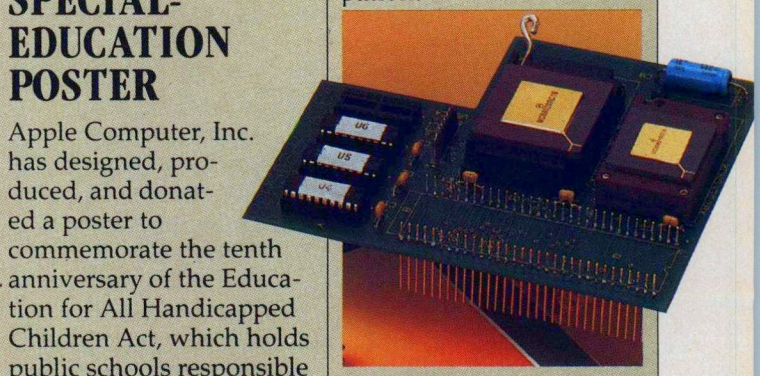
RAM WARS

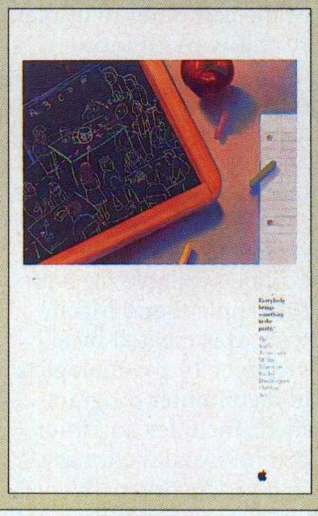
Applied Engineering deserves credit for popularizing memory-expansion boards that add a megabyte or more of RAM to an Apple II and help turn the Apple into a powerful business computer. Other companies such as Checkmate followed suit with their own products, and Apple's announcement of the Apple II Memory Expansion Card last fall indicated that Apple had seen the wisdom of providing high-end business-oriented add-on products to the Apple II series.

Now AST Research, one of the largest producers of add-on boards for the IBM PC series, has started shipping two one-megabyte RAM boards of its own. The SprintDisk is much like Apple's Memory Expansion Card, and the MegaRamPlus is an auxiliary-slot board that is similar to the Applied Engineering and Checkmate boards. AST offers a sophisticated enhancement called disk caching to RAMdisks on its boards; it moves files from the diskette to RAM as you need them, dramatically speeding up the operation of virtually any program that uses the disk drive during operation.

SPECIAL-EDUCATION POSTER

Apple Computer, Inc. has designed, produced, and donated a poster to commemorate the tenth anniversary of the Education for All Handicapped Children Act, which holds public schools responsible for appropriate and free education of handicapped children. The poster was unveiled during a congressional reception attended by more than 500 members of congress, parents with disabled children, leading educators, and officials of more than 20 groups that work with the handicapped. Dr. Alan Brightman, Director of Apple's Office of Special Education, hailed the legislation, saying, "We are honored to participate in this event. Nothing could be more consistent with Apple's vision of individual potential and participation."





CHIP CHAT

A 68020 microprocessor for your Mac could make it faster than a speeding bullet and more powerful than a big, blue locomotive. The 68020 is a full 32-bit processor with many advanced features such as the ability to address up to a gigabyte of memory, dynamic bus sizing, interrupt processing, and coprocessor support. The 68020 is a superchip that will allow the Mac to

A 68020 could make your Mac more powerful than a big, blue locomotive.

grow into a supermicro with more power than a $20,000 Sun Microsystems or Apollo UNIX workstation. Although Apple has not announced any specific plans to use the 68020, it makes sense to think that its engineers must be working as fast as possible to make this state-of-the-art chip the heart of some future Macintosh.

You don't have to wait for a 68020 in your Mac if you have a good technical background and are willing to do some expensive experimenting. A new 68020 piggyback board designed for generic 68000 computer systems (not the Mac) is available to developers from Computer Systems Associates (7564 Trade Street, San Diego, CA 92121; [619] 566-3911). This board plugs into the 68000's socket and replaces the existing 8 Mhz 68000 with a 12.5 MHz 68020 and 68881 floating-point math coprocessor. The floating-point coprocessor really speeds up operations such as number crunching and graphics. I'm going to try to see how hard it is to use it in a Mac. I'll keep you posted.

THE CLOSEST INTERFACE

The recent COMDEX exhibition in Las Vegas covered more than one million square feet and qualified as the largest computer show of the year, but there were surprisingly few new-product introductions as compared with previous years. One new product that couldn't help but catch my eye was IntraCourse, "the computer program for sex," being promoted by well-known psychologist and broadcast personality Dr. Joyce Brothers.

Dr. Brothers, who seems to be vying for recognition as a high-tech Dr. Ruth Westheimer, introduced the program at a COMDEX press conference by calling sex "the closest human interface" and saying, "IntraCourse is the first program to scientifically bring the power of the computer to human sexuality. With IntraCourse you can privately explore and better understand your own sexuality, and two persons can mutally discover each other's sexual attitudes."

The program, which will be available for both the Apple II and Macintosh, was created by a group of 14 psychologists and computer programmers, includes an "interactive sexual dictionary," and produces a password-protected personal sexual analysis. According to the developers, each analysis is unique, and the chance of two people having the same one are one in a billion. For more information, contact IntraCorp, Suite 185, 13500 North Kendall Drive, Miami, FL 33186; (305) 382-6567.

NEW POSTSCRIPT FONTS

Adobe Systems, Inc., has created 15 new typefaces for the Macintosh, LaserWriter, and other PostScript-compatible devices. The 15 new faces are Garamond, Avant Garde Gothic, Palatino, Glypha, Optima, Benguiat, Friz Quadrata, Bookman, American Typewriter, ITC Machine, New Century Schoolbook, Lubalin Graph, Souvenir, Zapf Chancery, and Zapf Dingbats. They come in typeface packages that are available for an average price of $185 retail. Contact your local Apple dealer for details.

BEST OF '85

I'm getting the definite impression that, in contrast to 1985, 1986 is going to be a big year for product introductions. Although no new Apple computer models were introduced in 1985, I thought it might be appropriate to take a look at the most significant Apple products introduced last year, now that the year has come to a close.

In the Apple II arena, I think the most significant new software product is Instant Pascal, an interpretive version of Pascal that is virtually the same on the Apple II and the Mac. Instant Pascal bridges a software gap between the Apple II and the Mac, and I think it will help further Apple's lead in the education market. The most significant new Apple II hardware product is the UniDisk 3.5. Its 800K of diskette storage breaks an important barrier to developing sophisticated software for the Apple II.

In the Mac camp, the most significant new software package is Microsoft Excel, because it makes the Macintosh the computer you need if you want to run the world's best spreadsheet and because it lets Macintosh users work with the vast amounts of corporate data that are now stored in Lotus 1-2-3 files. In the realm of Mac hardware, the most significant new product is

Want More AppleWorks™ Power?

You could put an Apple™ 1 meg memory expansion card in slot 4 and add another Apple 1 meg memory expansion card in slot 5 (Apple's card only expands to 1 meg). You'll need a separate 80 column card for the auxiliary slot. Oh, and put a printer buffer card in slot 2. If you want RGB color, you'll need an RGB board in slot 7 then buy a hard disk (if you have any slots left).

You'll have a bigger AppleWorks desktop, but you'll still be limited to a maximum of 1350 records in the data base. And you're stuck at 2250 lines in the word processor. And AppleWorks won't automatically load itself into memory, and make sure you don't create a file bigger than your disks can hold because Apple's memory card won't segment a file onto multiple disks.

Or
You could get RamWorks II®!

You'll have a bigger desktop.

You'll also have up to 16,300 records (not 1350) in the data base and up to 16,300 lines in the word processor (not 2250). AppleWorks will now automatically load into RAM. And if you create a file greater than your disk capacity, no problem. RamWorks II will automatically save it on multiple disks. And because of our built-in printer buffer, you can continue to use AppleWorks while your printer is printing. Nice. RamWorks II has an RGB option, 16 bit option and is expandable to 3 megabytes. And don't forget, RamWorks II is the software industry standard for memory expansion in the IIe. RamWorks II is automatically recognized by virtually all memory intensive programs (and many more are on the way) and is 100% compatible with all IIe software. So save your money and save your slots for other peripherals. Order RamWorks II today! Want more info? Just turn the page.

AE™

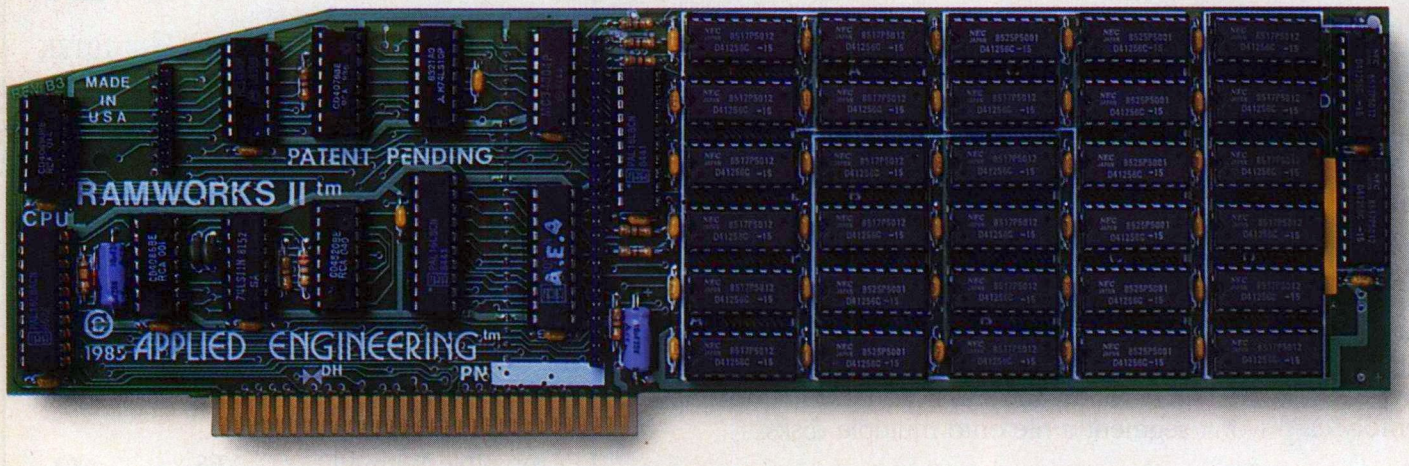
APPLIED ENGINEERING
"We Set the Standard"

	RamWorks II®	Apple's™ Card
Maximum Desktop	2277K	1012K
Maximum Number of Records in Database	16,300	1350
Maximum Number of Lines in Word Processor	16,300	2250
Autoloads AppleWorks	YES	NO
Auto Segments Files	YES	NO
Built-in Printer Buffer	YES	NO
Compatible With All Versions of AppleWorks	YES	NO
Displays Time & Date on AppleWorks Screen with Clock	YES	NO
Saves Slots	YES	NO
RGB Option	YES	NO
16 Bit Co-Processor Port	YES	NO
Memory Expansion Port	YES	NO
Patent Pending Power-Saving Circuit	YES	NO
80 Columns Built-in	YES	NO
CP/M RAM Disk	YES	NO
Compatible with Franklin 2000 Software	YES	NO
Maximum Total Functions	6	1
Software Standard	YES	YES
Manufactured in	America	Singapore
Warranty	5 years	90 days
Price with 256K	$219	$249 est.

AppleWorks and Apple are trademarks of Apple Computer.

Meet RamWorks II®

The Recognized Industry Standard For Memory Expansion of the Apple IIe.



RamWorks II. A Generation Ahead. Again.

The best selling expansion card for the Apple IIe just got even better. With RamWorks II, expand your IIe to an incredible 3 megabytes of usable RAM.

Turbo Charged AppleWorks.

RamWorks II plugs into the IIe auxiliary slot and acts just like Apple's extended 80 column card, only better—because if you buy a 256K or larger card, AppleWorks will automatically load itself into RamWorks II. This dramatically increases AppleWorks' speed and power because it effectively eliminates the time required to access disk drive 1. Now, switch from word processing to spreadsheet to database management at the speed of light. AppleWorks responds the moment your fingers touch the keyboard.

But AppleWorks has certain internal limits, independent of available memory. Fear not. Only RamWorks II (and the original RamWorks of course) removes those limits. Only RamWorks II increases the maximum number of records available from 1,350 to over 16 000. Only RamWorks II actually increases the number of lines permitted in the word processing mode. And only RamWorks II features a built-in printer buffer, so you no longer have to wait for your printer to stop before going back to AppleWorks (256K or larger RamWorks II required).

With RamWorks II, you won't have to split your data into 2 or more separate files because you'll have the necessary memory to access ALL your data ALL the time, quickly and conveniently.

RamWorks II	AppleWorks Desktop
128K	101K
256K	188K
512K	378K
1 MEG	758K
1.5 MEG	1136K
3 MEG	2277K

The Most Friendly, Most Expandable Card Available.

RamWorks II is compatible with more off-the-shelf software than any other RAM card. Popular programs like Advanced VisiCalc, Magic Office System, Flashcalc, The Spread Sheet, Diversi-DOS, Supercalc 3A, Magicalc, etc. (and hardware add-ons like Profile and Sider hard disks). Fact is, only RamWorks is 100% compatible with all software written for the Apple 80 column and extended 80 column cards. In addition, RamWorks II can emulate most other RAM cards, so you can use programs written for them without modification. And any size RamWorks II can be user upgraded later to any larger size.

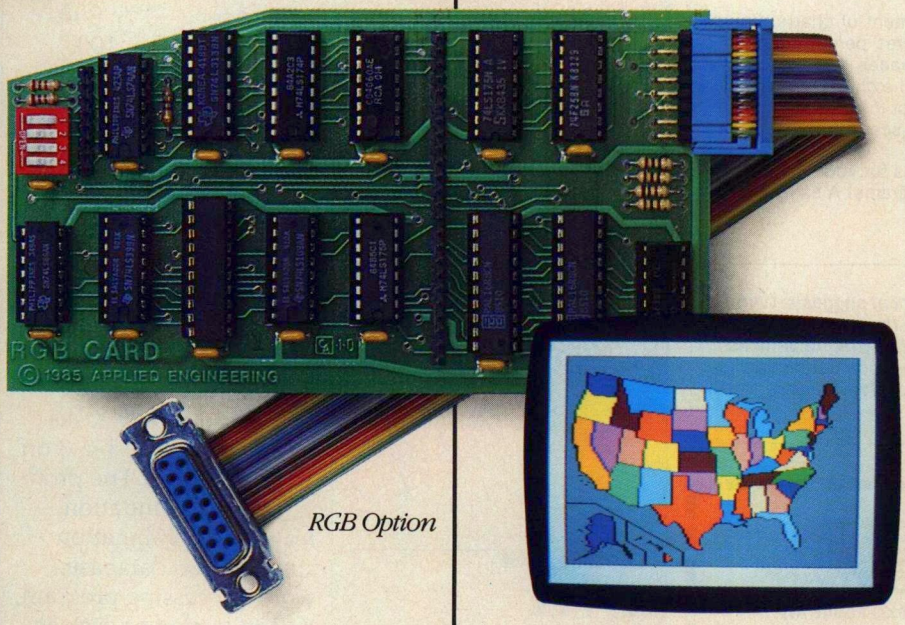
RamWorks II was designed so you could take full advantage of future developments in 16 and 32 bit microprocessors. As your needs grow, so can RamWorks II. A handy coprocessor connector allows the latest and greatest coprocessor cards to access all 3 MEG

of RamWorks II memory. And speaking of more memory, RamWorks II has a memory expansion connector on board so a low profile (no slot 1 interference) memory expansion card can add another 512K or 2 MEG of memory.

Unlike Apple's smaller, more expensive RAM card, RamWorks II plugs into the IIe auxiliary slot and therefore leaves slots 4 and 5 available for other peripheral cards.

It's In Color

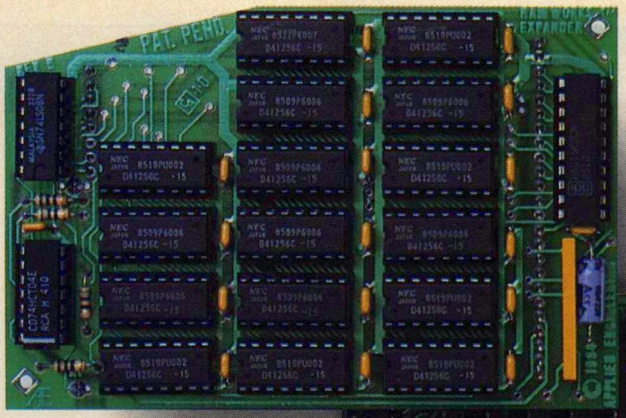
RamWorks II by itself is *fully* compatible with both the Apple monochrome and color monitors. But if you want better color graphics *plus* a more readable 80 column text (that blows away any composite color monitor) you'll appreciate our RGB color option. For only $129, it can be added to RamWorks II, giving you a razor sharp, vivid brilliance that's unsurpassed in the industry. The RGB option does not waste another valuable slot, but rather plugs into the back of RamWorks II with no slot 1 interference (works on the original RamWorks, too) and attaches to virtually any RGB monitor. And remember. You can order the RGB option with your RamWorks II. Or add it on at a later date.



RGB Option

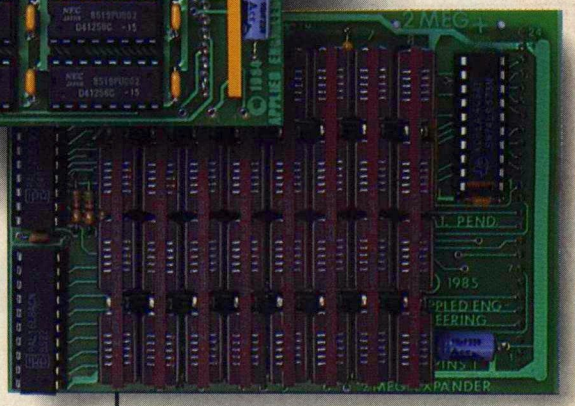
It Corrects Mistakes.

Let's say you bought some other RAM card (and that's a mistake) and your RAM card is not being recognized by AppleWorks, Advanced Visicalc, Flashcalc, Supercalc 3A, or other programs, and you want RamWorks II.



512K Expander

2 MEG Expander



No problem. The memory chips on the card that you now have, which is where most of the money is, can be unplugged and then plugged into the expansion sockets on RamWorks II.

It's Got It All.

- 15 Day Money Back Guarantee
- Super sharp 80 column text (patent pending) with or without RGB option
- Double high resolution graphics (with or without RGB option)
- Expandable up to 1 Meg (1024K) on main board
- Expandable to 3 Meg (3072K) with expander (piggyback) card
- Can use 64K or 256K RAMS in any combination
- Linear addressing coprocessor port
- Automatic AppleWorks expansion up to 2277K desktop
- Accelerates AppleWorks
- Built-in AppleWorks printer buffer
- The only large RAM card that's 100% compatible with all IIe software
- RamDrive ™ the ultimate disk emulation software included free
- 16 Bit option
- Compatible RGB option
- Built-in self diagnostics software
- No slot 1 interference
- Lowest power consumption (patent pending)
- Takes only one slot (auxiliary)
- Software industry standard
- Advanced Computer Aided Design
- Used by Apple Computer, Steve Wozniak and virtually all software companies
- Displays date and time on the AppleWorks screen with any PRO-DOS compatible clock
- 5 Year no hassle warranty

RamWorks II with 64K	**$ 179**
RamWorks II with 256K	**$ 219**
RamWorks II with 512K	**$ 269**
RamWorks II with 1 MEG	**$ 389**
RamWorks II with 1.5 MEG	**$ 549**
RamWorks II with 3 MEG	**$1699**
RGB Option (may add later)	**$ 129**
16 Bit Option (may add later)	**$ 89**

RamWorks II. The industry standard for memory expansion of the Apple IIe.

ORDER YOUR RamWorks II TODAY. 9 a.m. to 11 p.m. 7 Days, or send check or money order to Applied Engineering.

MasterCard, Visa and C.O.D. welcome. Texas Residents add 5⅛% sales tax. Add $10.00 outside U.S.A.

Applied Engineering
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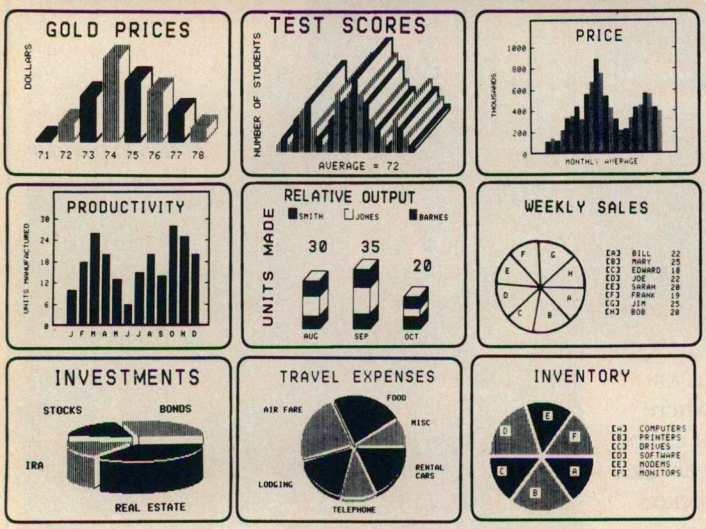
AlphaChart!



CHARTS! Don't pay more for less! The pictures shown above are examples of charts created with **AlphaChart!**, perhaps the most powerful and friendly Apple II chart program on the market. Within seconds, keyboard-entered data can be converted into picture-perfect pie or bar charts, in 26 user-selectable styles, automatically scaled and labelled, and in color or black and white. And **AlphaChart!** prints on most dot matrix printers. If you want to customize your charts by adding extra artwork or text, or display them in a slide show, **AlphaChart!** comes with these valuable extras.....

SLIDE PROJECTOR for orchestrating automated, stand-alone screen presentations of a series of charts, timed and sequenced by the user. This program alone is worth the cost of the disk. It can be used with any graphics files created with any program.

GRAPHICS EDITOR for alteration and embellishment of charts. Besides standard point-by-point sketching, built-in structures permit push-button creation of circles, rectangles, lines, shape-table shapes, and exotic woven plaid patterns. If you wish to add clarifying text to the charts, you may type on the screen in several different letter font styles. For the artist, the graphics editor can also be used to sketch any imaginable scene from scratch.

SHAPE TABLE EDITOR for creating special shapes for your charts. These shapes can also be used for animation in your programs! A sample animation program shows how to do it.

"The software does much more than the advertisement suggests. Without question, this is among the best buys if software that I have ever come across, and certainly among the best written. It is extraordinarily easy to use, very well thought out, and priced to kill your competition (which I wish you every success in doing)." **Anthony J. Scriffignano, North Caldwell, New Jersey.**

Only $29.95! SPECTRAL GRAPHICS SOFTWARE

Send me AlphaChart!
Here's my $29.95 check.

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IN CALIFORNIA CALL 1-800-231-7316.

Name

Address

City State Zip

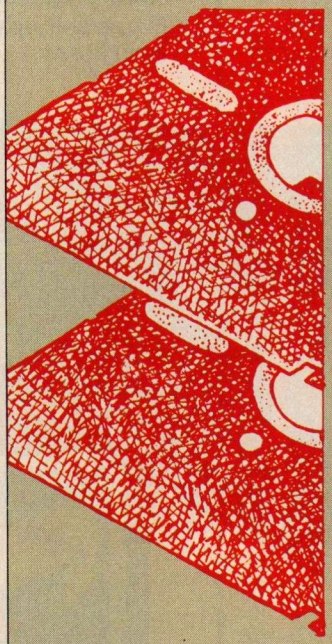
CIRCLE 109 ON READER SERVICE CARD

In contrast to 1985, 1986 is going to be a big year for product introductions.

APPLE SOFTWARE BUSINESS BOOMING

Apple appears to have finished the year with excellent sales. Although all the final numbers are not in yet, some of the early indicators are favorable. Hardware sales were up because of lower prices, and dealers were not left with as much inventory as they were last fall. According to an InfoCorp study last fall, Apple Computer, Inc. was ahead of IBM in software sales, both in dollar volume and in units sold. The breakdown is as follows: dollar share of U.S. software market—Lotus, 26%; Ashton-Tate, 16%; Apple, 9%; Microsoft, 9%; Software Publishing, 5%; and IBM, only 2%. Unit share of U.S. software market—Lotus, 16%; Apple, 11%; Software Publishing, 10%; Ashton-Tate, 8%; Microsoft, 7%; and IBM, 3%.

definitely the LaserWriter, which contains a computer more powerful than the Mac itself and is igniting the desktop-publishing industry. Both Apple President John Sculley and Apple Executive Vice President Bill Campbell have recently been quoted as saying that desktop publishing is one of the Macintosh's most important markets.

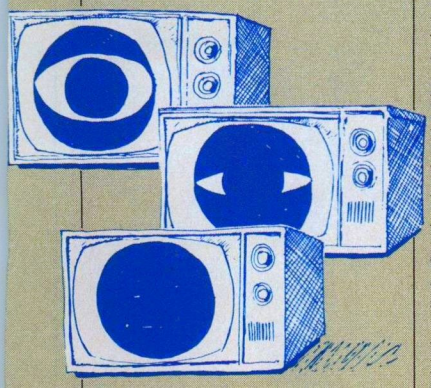


FOUNDATION

Stan Goldberg of Foundation Corporation recently called me to say his company had a new integrated-software product for the Apple II series that performed certain tasks faster than Lotus 1-2-3 on an IBM PC did. The product, called Foundation, features a combination spreadsheet, database, word-processing program, and collection of desk accessories with windowing and a macro function. The product lists for $250. For more information, contact Foundation Corporation, 506 Armitage Avenue #1, Chicago, IL 60614. We'll let you know what we think of the product after we've had a chance to get our hands on it.

CBS SOFTWARE CLOSES

CBS, Inc., announced last fall that it would be closing its CBS Software division, which published several popular Apple titles including Murder By the Dozen, Felony! and Charles Goren: Learning Bridge Made Easy. CBS laid off 29 employees in



connection with the closure. Although CBS says it will continue to sell a few existing successful products, the company will not develop or acquire any new products for the home-computer-software market.

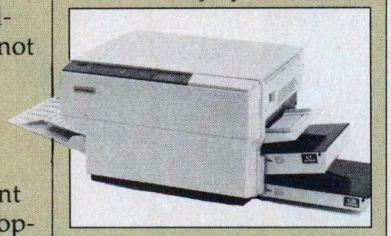
Ruth Landa, president of BrainBank, the developer of Murder by the Dozen and Felony!, says her company has its own marketing and distribution operations and wants to continue selling the two popular titles.

CBS is not, however, out of the software business altogether. When CBS announced the closing of the CBS Software division, the company also announced the formation of CBS Interactive Learning to develop and market computer software for the school, college, and medical markets.

LASERWRITER-COMPATIBLE

Dataproducts of Woodland Hills, California, has joined QMS of Mobile, Alabama, as another company that produces a PostScript-compatible printer. Dataproducts recently announced the LZR-2600 series of PostScript laser printers that print at 300 dots per inch and are compatible with the LaserWriter but offer higher performance at a higher price.

The Dataproducts laser printer is designed for a heavier duty cycle than



the LaserWriter is, can print up to 26 pages per minute, and accepts paper up to 11 × 17 inches. The printer has a sophisticated built-in computer that features a 10 MHz 68000, 2.5 megabytes of RAM, and 512K of ROM. For more information, call Dataproducts at (800) 258-1386 or (818) 887-8000. ✚

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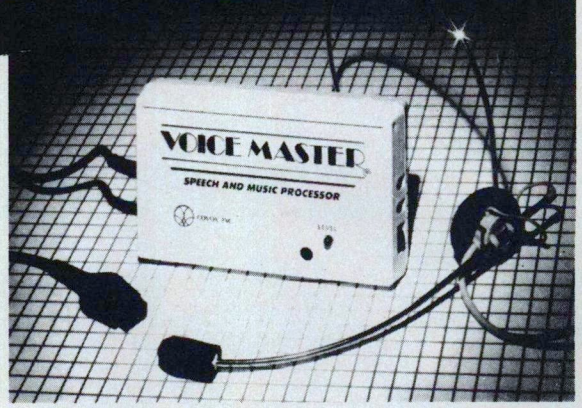

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BY ROBERT COWART AND STEPHEN CUMMINGS

Midi

A NEW MUSICAL REVOLUTION

What is MIDI, and how does your Apple II fit in?

The very same digital-electronics revolution that brought us the microcomputer phenomenon has redefined what we expect to hear in today's music and has radically changed the way music is made. You can hear it in any top-40 song, in high-tech TV commercials, in the theme music on network sports events, and even in elevator music.

A rainbow of timbres, from the most dazzlingly electronic to the most uncannily authentic imitations of "real" instruments, marks this music, as do rich musical textures and suddenly shifting rhythms that often conjure up the illusion of large bands. More often than not, however, what you hear is the work of just one or two musicians relying as much on programming skills as on instrumental virtuosity.

Synthesizing

The continuous evolution of musical technology that not so long ago replaced the harpsichord with the piano has taken another leap forward to what has generically been dubbed the synthesizer. Of course, the synthesizer isn't news anymore. Wendy Carlos' groundbreaking *Switched on Bach* album (performed entirely on the Moog synthesizer) was released more than 15 years ago and is still the best-selling classical recording of all time. Like all sophisticated electronic devices, synthesizers have evolved tremendously over the past 20 years, as developments in electronics have been adapted to the special needs of musicians. What is new is the availability and affordability of powerful hardware and a much greater ability to control networks of musical devices with precision.

Like mainframe computers, "real" synthesizers used to weigh hundreds of pounds and cost many thousands of dollars. A full-blown Moog system could line a wall from floor to ceiling and drain a lifetime of savings. Plummeting integrated-circuit prices have brought the cost of synthesizers down to earth and made their bulk manageable. A decent instrument can now be purchased for less than $1000 as a self-contained unit, including a keyboard, that weighs 15–30 pounds and whose base measures around 3 × 1 feet.

A rainbow of timbres marks this music, as do rich musical textures and shifting rhythms.

Early synthesizers were modular in design, each module performing a separate function in shaping the sound. Just as early computers had to be hard-wired before the invention of software programming, a modular synthesizer required connection of the individual modules in the desired configuration with patch cords (cables with connectors on each end) and then adjustment of each module's controls. Synthesized-sound sculptors might spend hours or even days adjusting the instrument until they were satisfied with the sound. To preserve their creations, they'd then have to write down the exact position of each and every knob and patch cable if they wanted to recreate the same sound later.

Microprocessors were an obvious solution to such housekeeping drudgery because they could read the position of each knob and store it as a value to be called up from memory at any time. Likewise, you no longer needed a tangle of patch cables in order to connect modules. Instead, you were able to choose one of an instrument's many predefined routings, selecting and storing it along with module-control settings for a complete sound definition "program" for later recall and play.

Musicians welcomed the increases in convenience and the cost reductions that microelectronics brought, but a major problem, common to the development of all parts of the electronics industry, remained: the absence of interfacing standards that would let synthesizers work with one another. For example, you couldn't necessarily expect to play your Roland synthesizer from the keyboard of your Minimoog synthesizer.

Finally, in a rare cooperative effort, electronic-instrument manufacturers have now developed a communications standard for musical devices that may prove to be one of the greatest advances in music since the adoption of the equal-tempered scale nearly 300 years ago. Announced in 1983 and quickly adopted by the entire industry, the MIDI (Musical Instrument Digital Interface) standard is fueling the introduction of numerous

TOM LULEVITCH

powerful and fascinating products for use by both professional and amateur musicians.

In its simplest application, MIDI allows you to play any number of synthesizers from one keyboard to produce combinations of sounds that you can't get from a single instrument. Since MIDI information is simply a digital data stream, you can use many devices other than keyboards to create, send, receive, and respond to MIDI data. For example, you can make specially equipped guitars or microphones generate digital information in the MIDI format and then control the sound-generating circuitry of a synthesizer. In fact, many manufacturers are now offering keyboardless synthesizers for use with any MIDI controller.

MIDI also allows remote programming of synthesizers. A musician can set all the parameters that determine the instrument's sound from another synthesizer or a programming device. Effects devices such as reverberation units or "chorus" effects can also be controlled from a master MIDI device. Even the lighting for an entire performance can be programmed in sync with the music.

MIDI Technical Details

An understanding of the role of the computer in this musical maze first requires a bit more technical detail about MIDI. If you are a nontechnical reader, don't be thrown by the specifics if you don't understand them.

From a technical standpoint, MIDI uses a relatively simple serial hardware and software protocol. The hardware requirements of the MIDI standard are minimal, specifying only the type of cable (a shielded three-wire cable with five-pin DIN connectors at either end) and a circuit design appropriate for receiving and transmitting data in the MIDI format at 31.25 kilobits per second.

A MIDI-equipped device, whether it be a synthesizer, a computer, or an effects module, should have three ports (also called jacks) for MIDI communications, labeled IN, OUT, and THRU (some units lack the THRU jack). Data travels along a single MIDI cable in one direction only, from the OUT port of one device to the IN port of another. The THRU jack passes data that has been received by the device from an external source back out again, so that many MIDI units can be linked in series.

The MIDI standard opens a new world for musicians and computerphiles, especially Apple owners.

MIDI's software protocol specifies the format for transmission of MIDI data. The MIDI standard provides for three types of data: standard codes, which turn notes on and off at the proper times and specify each note's relative volume; optional codes, for adding modulations such as pitch changes and vibrato; and the system-exclusive functions, codes unique to each synthesizer for programming it. Sixteen MIDI channels are provided in software. You can set each synthesizer or other device in the system to a different channel, and it can receive its own instructions, which it can pick out in the data stream by recognizing its four-bit channel identifier.

MIDI is not a perfect standard, and criticism of the standard itself and its implementation on some instruments has existed from the beginning. Nevertheless, musicians have accepted it gladly, as a survey of the market reveals: Every new professional electronic keyboard is MIDI-equipped.

Enter the Apple II

Computers are just as capable of handling MIDI data as are any other instruments or devices, since handling streams of information is what computers do best. Thus, the MIDI standard opens a new world for both musicians and computerphiles, especially Apple owners, since so many MIDI packages are now available for the Apple II.

Academic musicians located at well-endowed universities have long used expensive computers for musical education, sound analysis and synthesis, composition, and other musical tasks. Now, the affordability of microcomputers has finally made these applications available to nearly everyone. Apple IIs are perfectly suited to musical uses because of their open design (internal card slots), and a wide variety of musical software and hardware has appeared as a result. The Music Construction Set and the Mockingboard synthesizer board are probably the most successful and well known of these musical products for the general market.

Serious musicians were far more interested, however, in packages developed by Syntauri Corporation and Passport Designs that turned the Apple into a full-featured synthesizer. Both the alphaSyntauri and Passport's Soundchaser were keyboard-and-software systems that used Mountain Computer's fairly sophisticated digital-synthesizer cards to generate sound. Although the synthesizer cards lacked state-of-the-art fidelity, their digital oscillators could produce unique timbres, and the alphaSyntauri and Soundchaser packages offered features that weren't available on far more expensive synthesizers. For a few years, alphaSyntauris and Soundchasers were very popular and they showed up in schools, on professional recordings, and in thousands of homes. Eventually, though, compact, inexpensive, dedicated synthesizers with fully professional features forced Passport out of this market and Syntauri out of business.

Nevertheless, the microcomputer's role as a tool for musicians has increased. Running properly designed MIDI software, an Apple can perform a whole range of musical tasks better than can a collection of separate special-purpose devices that cost far more. Although new computers from Atari and Yamaha have MIDI ports built right in, Apple-II-series computers are currently the machines of choice for most musicians. In early 1984, Passport was the first company to bring MIDI products for computers to market, with an interface card and a pair of programs for Apple IIs. A

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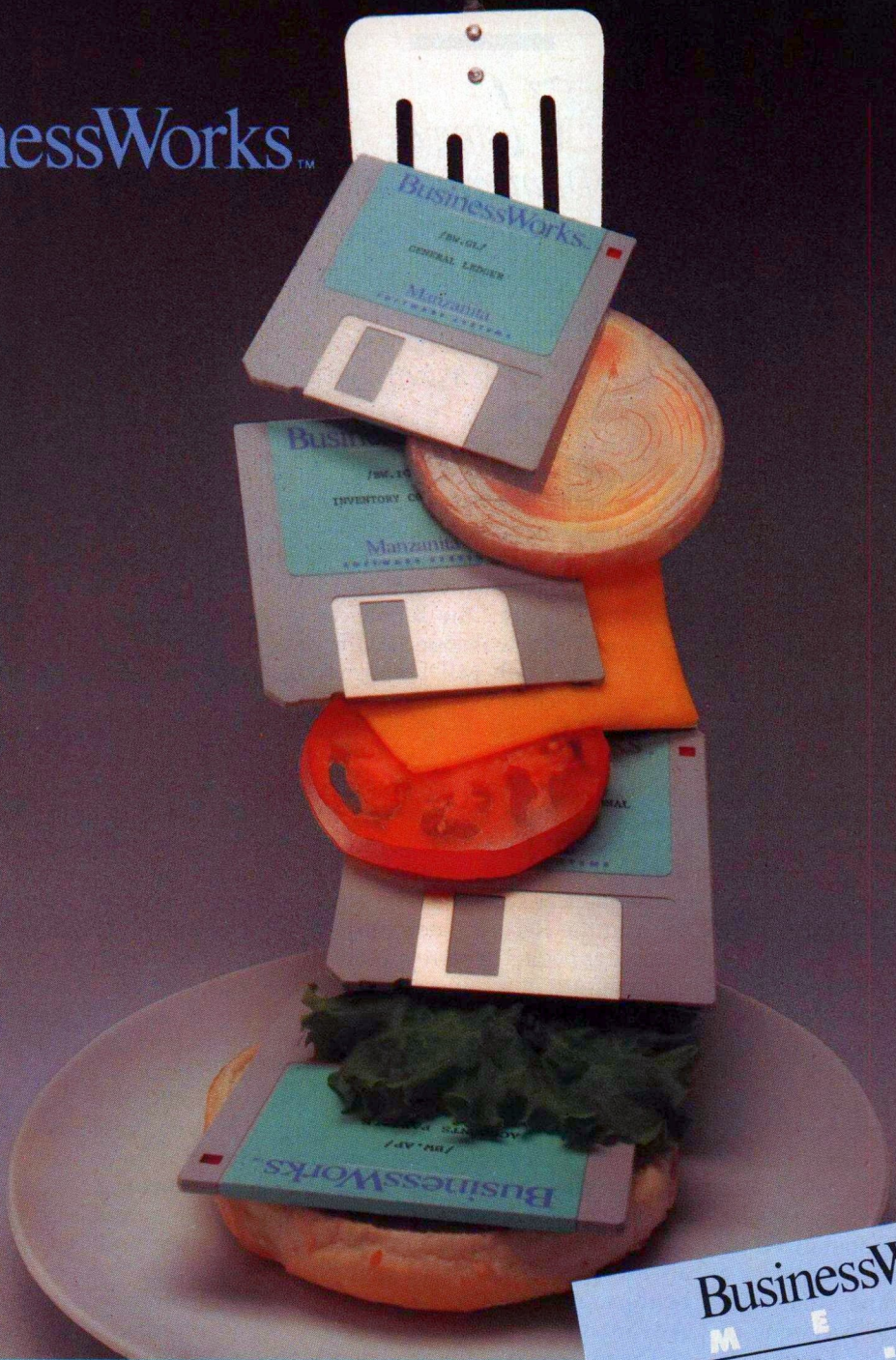

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year and a half later, MIDI products for Apples are available in abundance. Let's take a look at the five general categories into which these products fall.

MIDI Interfaces

Lacking built-in MIDI capability, either the Apple II or Macintosh first needs some additional hardware. The Apple II, II Plus, and IIe require the addition of a small plug-in interface card. For the Apple IIc and the Macintosh, an external box and connector are necessary.

The purpose of the interface card is simply to provide a data path between the computer's data bus and the MIDI data bus. Creating this data path requires a high-speed serial-to-parallel interface and voltage-conversion circuitry. Minimally, an interface must supply MIDI IN and OUT jacks. Some cards also feature a "drum-sync" jack for controlling various brands of electronic drum machines, and others have a "tape-sync" jack for synchronizing multitrack tape recorders with your Apple/MIDI system.

MIDI Sequencers

Anyone familiar with the alpha-Syntauri or Soundchaser systems or who has worked in a multitrack recording studio is well aware of the versatility inherent in these systems. The ability to record sections of a piece of music one instrument at a time and to play them all back at once through multitrack recording was an exciting development popularized by the guitarist Les Paul during the 1950s. Multitrack tape machines have since become the backbone of the recording industry and will continue to be the primary medium for professional music recording, especially for the recording of acoustic instruments.

Electronic instruments, on the other hand, with their potential connection via MIDI, offer alternatives to and advantages over multitrack tape. Using a MIDI interface and sequencer software, your Apple can become a MIDI multitrack recorder. Here's how it works.

Sequencer programs operate in two modes, record and play, just like a normal tape recorder does. The genesis of the name *sequencer* is that the programs remember and can replay sequences of events—e.g., which note you pressed and how long you held it down. Unlike a tape recorder, however, the sequencer records not the actual sound of the music, but rather only MIDI information, such as which keys you pressed and how hard or how long you pressed each one.

Using a MIDI interface and sequencer software, your Apple can become a MIDI multitrack recorder.

To make a recording, you connect the MIDI output jack from an instrument (typically a keyboard) to an interface board in the Apple and load the sequencer software. Once you've set it in the Record mode, the Apple computer begins to store all the MIDI information it receives, saving this data temporarily in RAM. It can store as many as five parameters about each note, including pitch, how hard each note was struck (key velocity), when it was pressed and released (key on and key off times), and how hard the key was pressed down after hitting bottom (aftertouch—used for special effects). In addition, you can also record sustain-pedal and pitch-bend parameters.

Advantages of Sequencing

Depending on which sequencing program you choose for your Apple/synthesizer combination, more or fewer features will be available to you. In general, the value of using a sequencer is somewhat akin to using a word-processing program for writing. That is, once you have entered your data (music), you can manipulate or rearrange it in numerous ways, until it finally sounds the way you like it. Just as we can decide to print out this article from a word-processing program with any number or types of printers, MIDI-recorded music can be played on any MIDI instrument, from a $15,000 Kurzweil to a $350 Casio synthesizer, without modification of the music itself.

The other common denominator of sequencing programs is their multitracking capability, which allows a piece of music to be recorded one track at a time, with tracks later edited individually, linked, or merged "on top of" one another. In contrast to what you can do with normal tape recorders, you can perform an infinite number of digital overdubs without the usual problem of tape noise such as hiss being multiplied with each take. Also, getting back to the beginning of a piece for each take is instantaneous. No more waiting for the tape to rewind, finding the right spot, and so on.

Another musicians' dream come true is a sequencer's ability to modify the tempo of a performance at any time. Until now, modifying the tempo of a recorded piece meant altering the speed of a tape recorder, which consequently changed the pitch of the music. With a few keystrokes on your Apple, however, you can speed up or slow down a MIDI performance without this effect. You can also record difficult parts of a piece at a slow speed and play them back at normal speed or even transpose the whole thing into a different key.

Transcribing

The symbols of standard musical notation and their "geographic" arrangement compactly record and communicate a tremendous amount of information about musical events and their interrelationships. A piece of written music lets you follow the flow of the music at a glance, and you can use the score to communicate to other musicians efficiently or to submit the composition to a publisher. The science (and art) of musical notation is not easily mastered, though, making this phase of the creative process a common stumbling block.

A music-transcription program can analyze MIDI data (what you've played on an instrument, for example) and convert the data into standard musical notation, on your

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computer's screen and/or printed out on paper. If you've ever struggled to write out a piece of music, you may feel a sense of awe the first time you watch it happen effortlessly. Getting the transcription to appear exactly as you want it is sometimes tricky, because the computer accurately displays all your little playing mistakes and because the software logic may not be able to handle every curve you throw at it, but most programs allow enough on-screen editing to let you clean up any rough edges.

Synthesizer Programming

Despite the elimination of bulky patch cords and controls in recent synthesizer design, programming a specific sound (often called a voice) for a synthesizer can be a tedious process of trial and error. What's worse, some newer instruments employ digital programming, meaning that they have no knobs to twiddle, so you typically accomplish voicing with tiny push buttons and a small alphanumeric display window. Although the elimination of moving parts increases product reliability and cuts costs, programming time and hassle have escalated as a result.

Several helpful tools called voicing programs have come to market that, along with the Apple, serve to ease this burden. Using the MIDI interface and MIDI system-exclusive functions, these voicing tools take advantage of the Apple's resources (particularly graphics) to aid musicians in sculpturing a desired sound.

Once you're satisfied with a series of new sounds, you can tuck them neatly away on floppy disks—one of the greatest savings that MIDI has to offer. A typical synthesizer RAM cartridge costs anywhere from $70 to $90 and holds 32 sounds; in contrast, a single floppy disk can store as many as 800 sounds! Small wonder that many inexpensive voice-library programs, jam-packed with preset parameters, but without sound-editing capacities, have appeared in order to meet the needs of musicians in search of vast (and painlessly acquired) arsenals of sound.

Low-cost dedicated synthesizers haven't completely squelched the demand for computer-based instruments, and for good reason. Most dedicated synthesizers can play in only one or two timbres at a time (monotimbral), whereas the alpha-Syntauri and Passport Soundchaser systems (and others) are capable of up to 16. Several upgraded cards, capable of higher fidelity and lower noise than the older products, have recently made an appearance.

Suddenly, any sounds, from trash-can lids to barking dogs, become musical instruments!

Of special note are the "digital sampling" cards for the Apple II. Rather than synthesizing sounds themselves, these cards digitally record real-life sounds through a microphone, assign pitches to them, and let you play them from the keyboard. Suddenly, any sounds, from trash-can lids to barking dogs, become musical instruments!

Music Education

The use of music-education software has all the advantages (and disadvantages) inherent in computer-aided instruction in general. There is no replacement for a good teacher, but musical training, both in performance and in theory, does often involve simple repetitive testing—a computer's forte. Music-education programs have been around for some time, particularly on the Apple II, using graphics and the Apple's internal speaker (or perhaps a plug-in sound board) to teach sight-reading, pitch and interval recognition, and even musical terminology.

Now, using MIDI, a computer can more easily supply a major part of your instruction aurally by playing your synthesizer for you. Educational programs can demonstrate melodies or chords and give students hints, prompts, and correct answers, as well as sense keyboard entry of notes. A properly designed program could ask a student to play music that appeared on the monitor and sense whether it was performed properly or not. The student's input could then be displayed next to the original on a musical staff, while the computer and synthesizer, via MIDI, played both parts for comparison.

You don't absolutely need a MIDI setup to use these features, but a good-quality synthesizer sounds much better and is much more fun than the tinny internal sound circuits in your computer. Program developers, in addition, will be more encouraged to write for an established widespread standard, especially one that eliminates the burden of bundling hardware with educational packages. As long as a school owns an Apple, a MIDI-compatible keyboard, and the correct interface, that should be enough.

MIDI has emerged as a standard method of interconnecting computers and electronic musical instruments. It allows computer-software and -hardware designers to create sophisticated control systems for musical instruments. These developments will benefit musicians by providing them with powerful creativity tools, will assist school and home users by providing new tools for computer-assisted instruction in music, and will aid the computer industry by opening up an important new market.

Because Apples have played a central role in the development of MIDI, *A+* is presenting three other articles in this issue that will give you an overview of MIDI and Apples. The first article, "MIDI Gear Galore," explores the various MIDI instruments that your Apple can control. The second, "A Crescendo of Products," is a survey of Apple II MIDI applications, and finally, "MIDI for the Macintosh" presents a roundup of Macintosh MIDI applications. ✚

Robert Cowart is a Berkeley, California, free-lance writer who specializes in microcomputer technology and music synthesis. Stephen Cummings is a nurse-practitioner, owns a music/computer-consulting company, and writes for Keyboard *magazine.*

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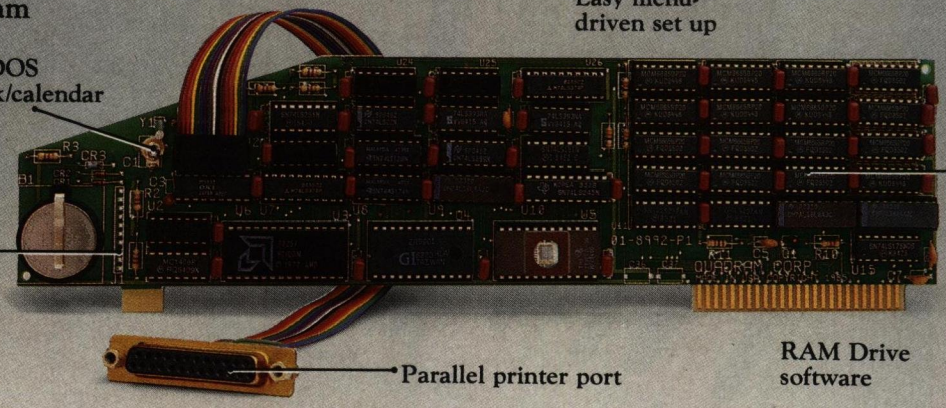

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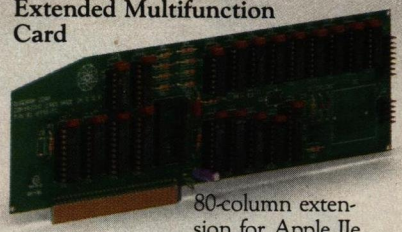

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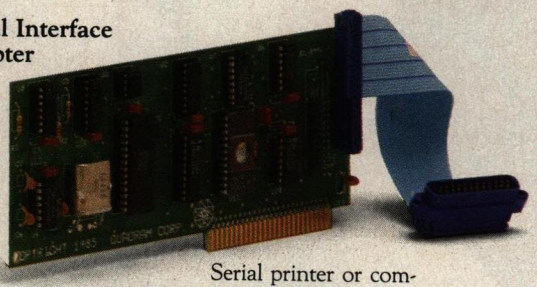

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BY FREFF

Midi

MIDI GEAR GALORE

An endless array of instruments and accessories awaits you.

MIDI is a communications protocol, so the logical question is "Once I've got my computer speaking MIDI, what can it speak MIDI *with*? The answer is that if it's musical and you want it, you can have it (or something very close to it).

No fooling. There's no good reason for anyone who's interested to hold back from exploring the wonders of MIDI, regardless of budget. In fact, so much MIDI gear is available right now that some computer users, well schooled in the ways of vaporware, may find the treasure trove too good to believe.

KEYBOARDS

Keyboards have dominated the MIDI scene since it began—hardly surprising, since the first microprocessors in musical instruments were in keyboard synthesizers (and the MIDI concept itself began life as a way of linking two different synthesizers so they could be played as one). What is unexpected is the depth, breadth, and speed of MIDI's penetration into the keyboard marketplace. In 1983 the first commercial MIDI product appeared, a small, inexpensive synthesizer from Sequential Circuits called the Prophet 600. Less than three years later, it's virtually impossible to find a keyboard without MIDI jacks—and I'm not just talking about "professional" or obviously electronic instruments, either.

SYNTHESIZERS

Although dozens of companies manufacture different synthesizers models, there are only three basic varieties, determined by how the synthesizer generates sound: analog synthesizers, digital synthesizers, and samplers.

Analog Synthesizers

Analog instruments are the old variety (an early analog synthesizer was used to record *Switched-On Bach*). Virtually all of them use a process called subtractive synthesis, in which oscillators generate simple-sounding waveforms that gain complexity—and therefore become more interesting to the ear—when various voltage-controlled electronic filters chop and edit the waveforms. They generate tones using analog electronics; the only software is for connecting and directing the various components, stabilizing tuning, and so on. The "analog sound" is generally characterized as warm, rich, and thick; recording engineers say it fills a track solidly. (They also say that too much of it makes for sonic mud.)

Some computer users may find the treasure trove too good to believe.

Prices for stand-alone analog synthesizers run the gamut from inexpensive to moderate. Small units such as the Korg Poly-800 are available in some stores for less than $500; instruments offering more punch and power, such as Octave Plateau's Voyetra 8, Moog Electronics' Memorymoog, or Roland's Jupiter 6 or JX8P, check in at prices ranging from $1500 to $2700. Price is a fairly good indicator of the power and flexibility of analog synthesizers: the number of oscillators, how many notes you can play simultaneously, the amount of built-in program memory, the array of real-time performance controls, and extras such as chorusing circuits and automatic arpeggiators. The more you pay, the more you get.

Digital Synthesizers

Digital synthesizers are relative newcomers, much too expensive for the average musician until recently. The change came when Yamaha used FM (frequency modulation) synthesis algorithms, created by Stanford Professor John Chowning, as the heart of a price and sales miracle called the DX7. With its fast and responsive keyboard, clarity, rich range of sounds, and price tag below $2000, the DX7 has become the most successful synthesizer ever.

Not to be outdone, the folks at Casio quickly launched their CZ series of instruments. These use a different kind of digital synthesis called PD (for phase distortion), sound great, and have even lower prices; you can find the CZ-101 in some stores for as low as $260! If you've thought of Casio products as toys, think again. You'll find the fruits of the CZ line on a lot of hit records.

Digital synthesis is very clear-

TOM LULEVITCH

sounding, just like digital audio, but each approach has its own character. Yamaha's FM synthesis has a slight tendency to sound metallic, especially in higher octaves, and Casio's PD synthesis sounds somewhat warmer but with a trifle less body. Both are absolute whizzes at bell and brass sounds, but because they have many more controllable parameters than the majority of analog synthesizers, they are tougher and less intuitive to program. Thus, a whole subindustry has arisen: companies that create RAM-cartridge or floppy-disk collections of preset sounds (referred to simply as *presets*) for folks who are more interested in playing the instruments than designing sounds.

A word to the wise on buying digital synthesizers: Price is *not* necessarily a good guideline, although newness may be. Each generation of these instruments has increased greatly in power and lowered drastically in price, so buy strictly on features and sound, and don't be surprised if cheaper is sometimes better.

Samplers

Samplers don't really synthesize anything at all, strictly speaking. Instead, they record and play samples (digitally recorded sounds). Samplers can give you everything from true oboes and clarinets to dogs barking Beethoven's Fifth, to—well, anything at all that can be recorded. More important, samplers usually provide you with ways to edit the digital sounds they play, letting you make sounds shorter or longer, faster or slower, sustained or stuttered, even backwards or blended.

Price is a major factor here, and the choice is still limited. In the last year, samplers for less than $2000, such as the Ensoniq Mirage, have finally appeared, but they can't match instruments such as the Emulator II from E-Mu Systems ($8000) or the Kurzweil 250 from Kurzweil Music Systems (around $17,000 with sampling option and the Macintosh computer required for storing sounds). If you have the financial resources, you might consider going all out for a Fairlight CMI ($30,000-plus) or a Synclavier ($100,000–$200,000!), but most of us will just deal with the trade-offs, which are usually in available memory and sound quality. For example, a Mirage stores only a couple of seconds of high-quality sound; the Emulator II, on the other hand, has room for up to 17 seconds, which you can cut up and arrange on the keyboard in almost any conceivable way. You have to decide for yourself if these differences make you want to leap the price gap.

Each generation of these instruments has increased greatly in power, and lowered drastically in price.

POLY VS. MONO

In the "old" days of five to ten years ago, synthesizers were either polyphonic or monophonic. Polyphonic synthesizers could play more than one note at a time, but monophonic synthesizers couldn't. Polyphonic instruments were clearly more useful, because they could play chords, so monophonic synthesizers have largely died out.

MIDI stirs the stew a little by introducing a new meaning for the *poly* prefix: *polytimbral*, i.e., able to play more than one type of sound at a time. MIDI has 16 channels, and some of the latest synthesizers let you divide their available sounds up among these. With the Casio CZ-5000, for example, you can hear up to eight notes of one sound at once *or* up to eight notes of different sounds. This flexibility is ideal for computer owners with sequencer software, because it lets them orchestrate without having to own a lot of synthesizers. Just put the brass, woodwind, and drum parts on different MIDI channels, assign the right sounds to those channels in the synthesizer, and let things rip. The only limit is the maximum number of notes the instrument can play at one time.

Most synthesizers today are still monotimbral (some notable exceptions are the CZ series and Sequential's MAX and SixTraks). Expect that situation to change.

MIDI IN OTHER KEYBOARDS

If your keyboard interests are more traditional, don't despair. Yamaha, Korg, Roland, Fender, and other manufacturers are putting MIDI into all sorts of keyboards: electric pianos, electronic pianos, organs (even the "home entertainment center" type), and portables—many of which are priced with consumers and hobbyists in mind.

You can even MIDI up your *real* piano, with an interface from Forte Music of San Jose, California that involves installation of a strip of microswitches that fits undetectably beneath the keys. You'll never even know it's there—until you play a chord and hear your synthesizer ring out in unison, that is!

MODULES AND CONTROLLERS

When MIDI first made two synthesizers play from one keyboard, some bright musicians out to save their backs and a few bucks started asking why they had to bother with the second (now redundant) keyboard. Design engineers got the point, and the result was a radically new approach to musical instruments. For the first time in history, the sound-generating and sound-controlling parts could be separate.

It was an explosive idea, and judging by the cloud of products hitting the market, the fallout is still settling.

Sound Modules

Keyboard synthesizers are as big as they are because of the keyboards, not the electronics. Throw out the ivories and you can pack a lot of punch into a very small package, at a considerably reduced cost.

That's the design concept behind MIDI modules, which are just boxes, usually designed to fit into an industry-standard 19-inch rack mount, with controls on the front and MIDI and audio jacks on the back. Just about anything you can buy as a stand-alone unit has a module equivalent, and there are some things you really can't get any other way.

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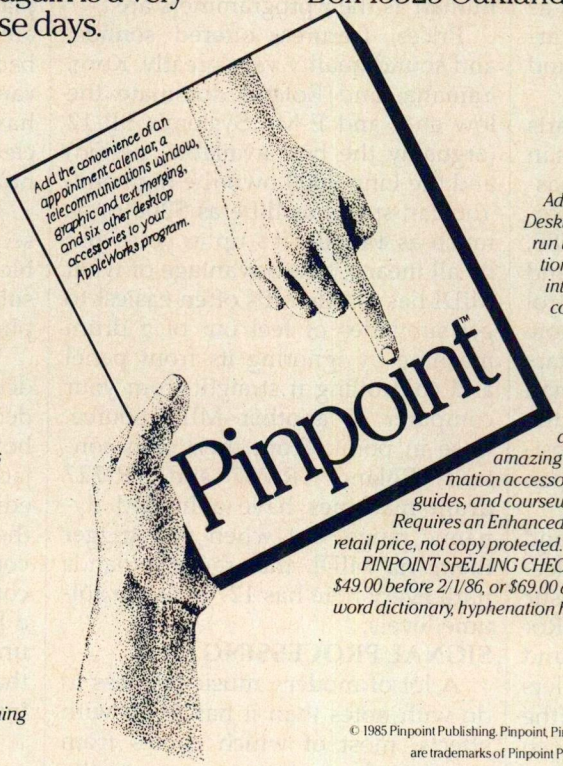

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You can spend as little as $200 or as much as $4000, but by all means, take advantage of what MIDI has to offer.

Korg offers the most cost-effective analog synthesizer on the market in module form, the EX-800. Yamaha makes a rack-mounted synthesizer called the TX816, which is *eight* DX7s in a space not much larger than the Manhattan Yellow Pages. The undisputed king of the modules is Roland, which has just capped an already extensive line with a unit called Digital Piano: 16 piano, harpsichord, and electric-piano presets of astonishing fidelity and realism, for only $1695. The instrument's scope and attention to detail are evident in that it lives up to the names of its presets, which include such classics as Steinway Piano, Steinway Piano with Lacquered Hammers (for that harder rock 'n' roll sound), and Bösendorfer.

Controllers

In the 70s, a keyboard player buried behind a mountain of synthesizers was a familiar sight, but these days you can't judge what's being played by what you see. Separate controllers are a boom industry and not just for keyboard players. MIDI sound modules don't care where they get their MIDI data from, as long as they get it, which means that guitarists, drummers, wind players, and even singers are joining in.

The new controller scene starts with two new developments in keyboards: high-quality master keyboards such as the Roland MKB-1000 and Yamaha KX88, with weighted, pianolike actions and the microprocessing power to control extensive MIDI networks, and remote keyboards that strap on like guitars do. The latter are good for more than just moving up to the front of the stage; the differences in hand position and body movement can open up whole new styles of playing.

Look beyond keyboards, and you'll find even more, including electronic drum kits with MIDI; acoustic drum kits with MIDI triggers; Roland's GR-series MIDI guitars and basses; prototype guitar controllers from several other manufacturers (the Voyetra guitar from Octave Plateau looks especially promising); pitch-to-MIDI converters such as Fairlight's Voicetracker and Cherry Lane's Pitchrider 2000, which let woodwind players and singers control synthesizers (albeit monophonically and not without glitches); organ-style MIDI foot pedals from Korg; and even a biofeedback controller, available by mail, that lets you trigger MIDI instruments with your alpha waves.

DRUM MACHINES

Drum machines have been around for a while, and their initial impact on popular music has passed. We're even experiencing something of a backlash, with more and more interest in drumming with a human "feel."

Don't let that stop you, though. MIDI drum machines are only as inhuman as their programmers are.

Prices, features, offered sounds, and sound quality vary greatly. Korg, Yamaha, and Roland dominate the low end, and E-Mu System's SP-12 (arguably the best available, period) and the Linn 9000 own the high end. You can spend as little as $200 or as much as $4000—it's up to you—but by all means, take advantage of what MIDI has to offer! It's often easiest to get subtleties of feel out of a drum machine by ignoring its front panel and controlling it straight from your computer or another MIDI source. Case in point: From their own controls, Roland TR-707 and TR-727 drum machines have a limited dynamic range, but when you trigger them via MIDI, that range expands until every note has 127 possible volume levels.

SIGNAL PROCESSING

A lot of modern music has less to do with notes than it has to do with effects, most of which comes from pieces of equipment generically called signal processors. Once upon a time, these were found only in studios, but falling prices and rising expectations have put them into the mass market.

The two most common signal processors are digital delay lines, which create echoes, pitch transpositions, and other effects; and digital reverbs, which give raw sounds a sense of ambient space. A few of these units, mostly from Japanese manufacturers such as Korg, Roland, and Yamaha, now have a limited MIDI capacity that enables them to change programs under the control of whatever synthesizer or MIDI source is connected to them.

More complex—and more interesting—are processors such as the new Lexicon PCM 70 digital reverb, which lets you actually control reverb parameters via MIDI. You can, for example, set it up so that changes in playing volume increase or reduce the reverb time.

SEQUENCERS

Sequencers are to MIDI instruments what piano rolls are to player pianos, a way of recording what notes are played and making them play back. In addition, most sequencers can record more than one track and have editing features that let you clean up weak performances and add notes never played by hand.

Don't underestimate the power of sequencers. Some of them are capable of recording, with tremendous subtlety and precision, an entire symphony of multitrack music.

Sequencers come in three types: dedicated, software, and hybrid. The dedicated types are basically little boxes of portable memory, with MIDI jacks, LCD readouts, and whatever editing capacity has been burned into their ROMs. Software sequencers are computer programs designed to record and edit MIDI data. Hybrids are a little of both—dedicated hardware units that have only RAM, rather than ROM, and get their operating instructions from a disk.

Each has advantages and disadvantages. The dedicated types of sequencers are portable, but the LCD

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interface is inherently limited when you're dealing with lots of complex MIDI data. They also are not easily expandable; with each new generation, older models will become obsolete. By contrast, software sequencers are easy and cheap to upgrade and offer a lot more power, thanks to the monitors, (relatively) massive memories, and computing powers of the machines they run on—you just have to own the computer and the right interface first. Also, they aren't terribly portable (even the Mac). Hybrids, being a mixture of the other two approaches, get a mixed grade. They are portable and easy to upgrade—for a while, anyway—but offer limited memory, controls, and readouts.

Software prices remain stable, but what the programs do for the money is going through the roof.

More than one musician has compromised by owning two systems: a software sequencer for home or principal studio use and a dedicated or hybrid sequencer for session work or the road. The strategy is possible because the data format of MIDI is standardized, so dumping sequences from one system to another is easy.

Prices of the hardware-based models are dropping fast, as the Japanese companies battle it out. Software prices remain stable, but what the programs do for the money is going through the roof.

MIDI NETWORKING

This is a capitalist society, and MIDI is less than perfect. Put these two facts together, and what have you got?

Accessories!

Meet the people at J.L. Cooper Electronics, in Los Angeles. J.L. Cooper isn't the only company supplying little extras to help smooth the MIDI trail, but it's certainly the widest-ranging and fastest to market, so it deserves a look. In its catalog of products, you'll find a wide variety of channelizers, filters, switch boxes, expression expanders, control-voltage interfaces, drum drivers, lighting controllers . . .

What? You say you don't know what all these accessories do? Well, to discuss them properly (without writing a whole article about the limitations of MIDI) would be kind of tough. Suffice it to say that J.L. Cooper is in the business of spreading oil on your occasionally troubled waters. If you've got two synthesizers that won't talk MIDI to one another properly because of design choices their manufacturers have made, J.L. Cooper probably makes a box that you can plug between them that will solve the problem. If you have an older synthesizer that you don't want to give up just because it doesn't have MIDI, J.L. Cooper probably has a retrofit kit or a MIDI-to-Control-Voltage interface that will do the trick. And if you're just overwhelmed with plugging in and unplugging MIDI cables every time you want to reconfigure your network, they're *definitely* the folks to talk to (my favorite is a switch box with 16 MIDI IN jacks, 20 MIDI OUT jacks, and 64 programmable settings that determine which is connected to which).

All very practical, very useful, and now and again fun. Especially this one: For professionals (and the repressed rock star in the rest of us), J.L. Cooper makes the MIDI Lighting Controller 1. It does exactly what its name implies—it triggers your stage lights from the MIDI data your instruments put out. Remember that the next time you sit down to play; you could be running through spectra as well as octaves, or playing some blues along with your blues.

MIDI makes all that and more possible, right now. Happy exploring. ✚

Freff is a contributing editor of Musician *magazine and the American reporter for a weekly BBC television program called "Micro Live." He also runs his own recording studio, which has an extensive MIDI network with four microcomputers, including an Apple II Plus and a Macintosh 512K.*

MIDI INFORMATION

Because the MIDI field is broad and changes rapidly, keeping up with what's available is a constant challenge. The best way to follow the field is to read magazines that cover the music and musical-instrument industries. They include the following:

Musician
P.O. Box 701
31 Commercial Street
Gloucester, MA 01930

Keyboard and *Guitar Player*
20085 Stevens Creek Blvd.
Cupertino, CA 95014

Electronic Musician
Mix Publications
2608 Ninth Street
Berkeley, CA 94710

Roland User's Group
7200 Dominion Circle
Los Angeles, CA 90040

The International MIDI Association Bulletin
11857 Hartsook Street
North Hollywood, CA 91607

One-Two Testing
First floor, Berkshire House
168-173 High Holborn
London WC1V 7AU, England

You might want to contact MIDI manufacturers directly for the latest information on products and prices. Here are some of the more prominent ones:

Akai
P.O. Box 2344
Fort Worth, TX 76113
(817) 336-5114

Casio
15 Gardner Road
Fairfield, NJ 07006
(201) 575-7400

Cherry Lane Technologies
110 Midland Avenue
Port Chester, NY 10573
(914) 937-8601

E-Mu Systems, Inc.
2815 Chanticleer
Santa Cruz, CA 95062
(408) 476-4424

Ensoniq
263 Great Valley Parkway
Malvern, PA 19355
(215) 647-3930

Fairlight Instruments
2945 Westwood Blvd.
Los Angeles, CA 90064
(213) 470-6280

J.L. Cooper Electronics
1931 Pontius Avenue
West Los Angeles, CA 90025
(213) 473-8771

Korg
Unicord
89 Frost Street
Westbury, NY 11590
(516) 333-9100

Kurzweil Music Systems
411 Waverly Oaks Road
Waltham, MA 02154-8464
(617) 893-5900

Lexicon, Inc.
60 Turner Street
Waltham, MA 02154
(617) 891-6790

Linn Electronics
18270 Oxnard Street
Tarzana, CA 91356
(818) 708-8131

Moog Music, Inc.
2500 Walden Avenue
Buffalo, NY 14225
(716) 681-7200

Oberheim
2230 South Barrington Avenue
Los Angeles, CA 90064
(213) 479-4948

Octave Plateau
51 Main Street
Yonkers, NY 10701
(914) 964-0225

Roland
7200 Dominion Circle
Los Angeles, CA 90040
(213) 685-5141

Sequential
3051 North First Street
San Jose, CA 95134
(408) 946-5240

Simmons
23917 Craftsman Road
Calabasas, CA 91302
(818) 884-2653

Yamaha International
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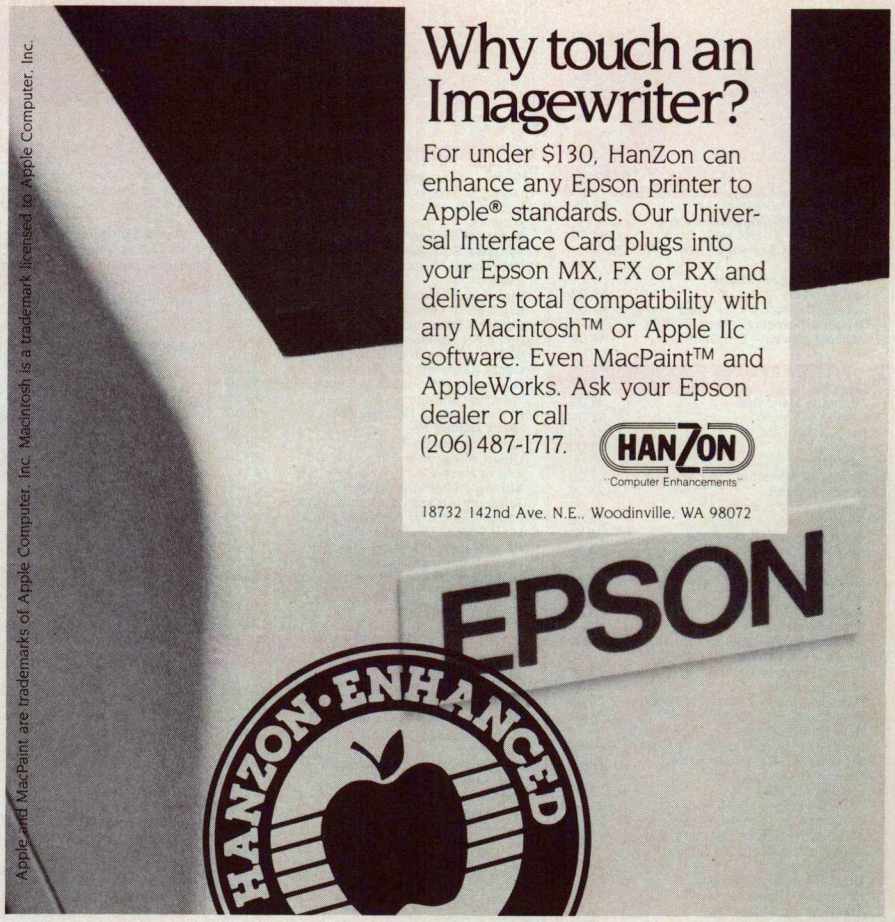
Buena Park, CA 90622
(714) 522-9011



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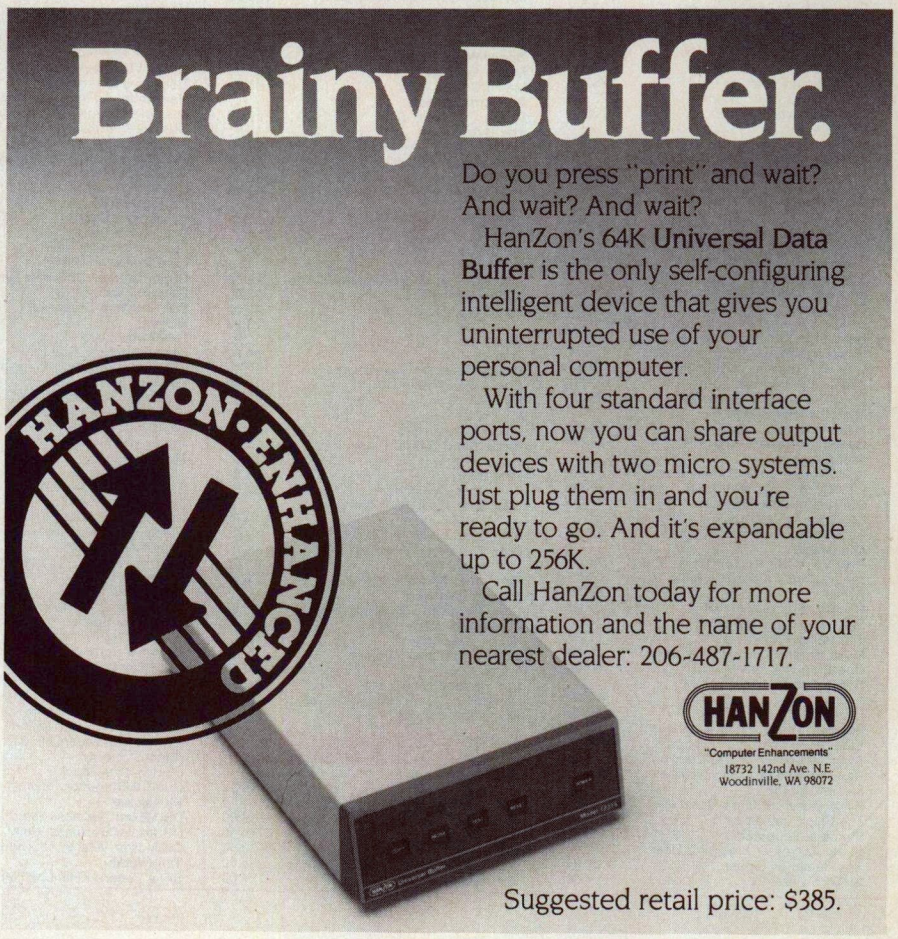

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AppleWorks Modify Plus 128K	49.00
Vilberg Brothers DMP Utilities	42.00

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Take 1	34.00
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Midi

A CRESCENDO OF PRODUCTS

Apple II MIDI software

"I like to think of MIDI as being the great equalizer," says Stephen Webb, a Long Beach, California, public-relations writer, amateur keyboardist, and Apple IIe owner. "Because MIDI is such a widely accepted international standard, my Apple can receive musical data through 16 MIDI channels just as quickly as Phil Collins' drum machine can. And the technology available to Michael Jackson is fundamentally the same as that being sold every day to Apple II owners, whether they're studio pros or rank amateurs. In terms of composition editing and tape synchronization, I'm doing things in my home the Beatles would have killed for in 1967!"

Webb's comments may sound like hobbyist hyperbole, but a quick scan of the professional-music business substantiates his claims.

- Michael Boddicker, the acclaimed studio musician who programmed the synthesizers for Michael Jackson's megasuccessful album *Thriller*, frequently takes to the road to tout Roland Corporation's family of digital music products (including MUSE—MIDI User's Sequencer/Editor—a versatile music-software tool for the Apple II).
- Reclusive keyboardist Jan Hammer, formerly with the seminal jazz/fusion group Weather Report, uses his phalanx of personal computers and MIDI-equipped instruments to singlehandedly compose the soundtrack for TV's hit series "Miami Vice." Hammer needs only his hardware and software, rather than dozens of symphonic sidemen, to get the job done—and he composes not in sweltering Dade County, Florida, or in Hollywood, but in the privacy of his farmhouse in rural Holmes, New York.

There's no denying the synergy that arises from the marriage of MIDI and personal computers.

- Lest you think that only trendy chart-toppers such as Duran Duran and Tears for Fears use computers to make music, get a load of these MIDI converts: Grammy-winning jazz keyboard player Oscar Peterson; avant-garde composer Philip Glass (*Einstein on the Beach*; *Mishima* soundtrack); and Joe Ely, one of the Young Turks of country-and-western music, who composed the tunes for his most recent album, *Hi-Res*, on an Apple II and even used it to create snazzy graphics for the album's lyrics sheet!

There's no denying the synergy that arises from the marriage of MIDI and personal computers, yet the excitement really doesn't span the spectrum of Apple II applications. The drama derives primarily from Apple II software packages that provide professional-caliber sequencing/editing and voice libraries. Meanwhile, the innovations have slowed to a trickle in other Apple II applications such as score printing and music education. (I'll explain why in just a moment, but suffice it to say that the Apple II drought in these areas has a lot to do with the Macintosh's superior graphics and with a school-age baby boomlet that hasn't quite materialized.)

Perhaps these other Apple II market segments are bound to pale in comparison to the full-throttle creativity and price slashing in the sequencer/editor and voice-library markets. "What I've seen in Apple II sequencers and voice libraries recently has been incredible," says Doug Cohn, a New York City recording engineer and longtime Apple II Plus owner. "As recently as 1982, you needed a $50,000 digital synthesizer such as a Fairlight or a Synclavier to accomplish what you can do today with an Apple II and about $500 worth of software and interface hardware. That means that prices have dropped hundredfold in some cases. So I ask you: Have the prices of database-management programs or word-processing programs dropped that much in the same period? Apple II music software still delivers what Jobs and Wozniak envisioned from the start: genuine innovation at a price that's within reach of the average consumer."

TOM LULEVITCH

Comparing the transmission rates of modem data to MIDI data is like comparing the speed of a stagecoach to that of the Starship Enterprise.

Dozens of Apple II music-molding products enable today's semipros to create better music than the semiretired 70s stars and producers who luxuriated in 24-track studios. Before you charge into this musical arena, here's a tip: You're going to have to master three sets of overlapping jargon—the argot of synthesizer programming, audio buzzwords, and some brand-new MIDI expressions.

For example, if you walk cold into a MIDI Mavens' Convention, you're liable to overhear exchanges like "Let's change the default to the OMNI OFF, POLY Mode . . ." Similarly, synthesizer programmers (who almost invariably scrunch the word into a single syllable, *synth*) have amassed a huge body of buzzwords. A patch, for instance, is a synthesizer-created tone color, not a Br'er Rabbit hangout. And then there's the underpinning of audio terms, most of which have slightly sinister, Stephen King-like connotations: attack, decay, pink noise, and so forth.

Here's my last caveat to Apple II/MIDI newcomers: Don't purchase music software until you find out what type of MIDI interface it requires. There are basically two types of gizmos to choose from: The one-card-does-all interface (a card with built-in MIDI jacks that plugs directly into an Apple II expansion slot, first popularized by Passport Designs) and a combination black-box/Apple-expansion card (such as Roland's MPU-401 freestanding interface unit and the accompanying MIF-APL plug-in card, plus a cable to connect the two).

Passport and Roland are, in fact, the premier vendors in the interface business. Some Apple II music programs work solely with a Passport interface; others require a two-piece Roland hookup. Several other companies are trying to dethrone both the de facto interface kings, so be careful. Most of these second-wave interfaces are of the one-card-does-all variety and feature numerous "on-board" conveniences such as tape sync and drum sync. Everything, in short, except the kitchen sync!

Sequencer/Editor Software

In MIDI lingo, a sequencer is a software program capable of holding long strings—or sequences—of digitized "performance data" transmitted (according to MIDI standards) from a MIDI-equipped instrument to your computer. MIDI doesn't concern itself with such things as timbre, so you can enter your performance data on a guitar controller and play it back on a MIDI-equipped keyboard synthesizer (or "sound module," a slave synthesizer used only for playback, not as a MIDI controller).

The performance data that MIDI relays includes key-press/release information (how long did you hold the key down?), changes in synthesizer patches and presets, the movement of synthesizer switches and controllers (to achieve things like vibrato on/off and damp-pedal sounds), and pitch-bend data (those eerie alterations in pitch that create sinking/soaring sounds).

MIDI Moves!

A ton of MIDI information must be transmitted for every sonic glide and slide a synthesizer player produces—not to mention such aspects as note duration, tempo, vibrato, and so on. So, in order to help shuttle all this performance data from MIDI controller to computer, the founding fathers of MIDI agreed on a very fast transmission rate: roughly 31,250 bits per second. Therefore, comparing the transmission rates of modem data (300 bps or 1200 bps for most Apple IIs) to MIDI data is like comparing the speed of a stagecoach to that of the Starship Enterprise. So whatever your MIDI gripes may be, transmission speed won't be one of them. MIDI moves!

Like those Hollywood "hyphenates" who lay claim to titles such as producer/director, most MIDI sequencers for the Apple II family are actually sequencer/editor programs. Here are some of the once-exotic music-editing features that are now fairly standard on these programs:

- 4000-to-6000-note capacity
- Easily alterable tempo and time signatures
- Ability to layer 4 to 16 tracks (The sequencer/editor becomes, in effect, the digital equivalent of a multitrack audiotape recorder.)
- Ability to loop or chain previously recorded musical passages (Users can auto-repeat certain measures to sidestep the recording of repetitious sections.)
- Software support for most varieties of synchronization, internal sync, MIDI sync, tape sync (for matching up to audio tracks recorded at a studio or on a portable multitrack recorder), and drum sync (for both digital and conventional drums)
- Auto-correct features that let users smooth away (or "quantize," in MIDI jargon) any timing errors—e.g., a sixteenth note held a hair too long. Most programs that offer this feature let you auto-correct in resolutions ranging from a quarter note to a 1/32 note.
- An audible metronome that you can switch on or off. Many programs let you hear the metronome for one or two measures before the actual recording of a track begins.

Voice Libraries, Voicing Software

When computer-music aficionados get together, the term *voice* doesn't refer to Andy Rooney's distinctive whine or George C. Scott's trademark growl. In this context, a voice is the output of a single audio-signal path and its digital equivalent. MIDI doesn't carry information about timbre or warmth of a tone, only the numbers corresponding to voice

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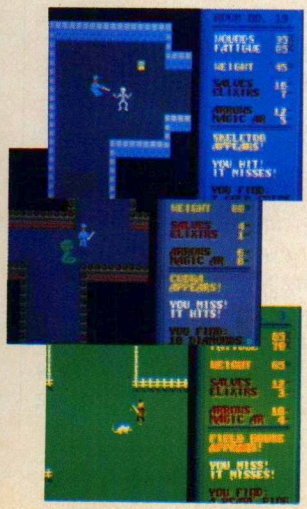

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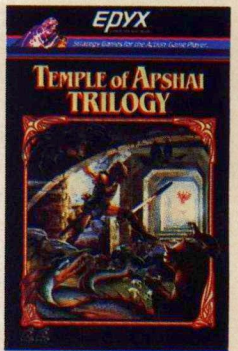

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groupings. Eventually those numbers are converted back to audible output, and the voice groupings that produce rich tonal colors are usually called patches (as in *violin patch* or *brass patch*).

Now that the art of synthesizer programming has become such a time-consuming, software-intensive pursuit, many synthesizer players prefer to buy their patches rather than create them from scratch. Ironically, there's a booming demand for custom-crafted Apple II software patches and sound libraries in an era when many cottage-industry hackers are going broke. In some cases, this thriving commerce in patch and library software is a cottage industry for mansion dwellers. Some of the finest patch makers in business today are music-industry luminaries such as Carmine Appice (former drummer for The Jeff Beck Band) and session "synthman" Bo Tomlyn (whose clients have included Bruce Springsteen and Toto).

Although many patches and voice libraries are written for your Apple II, the software's ultimate purpose is to elicit great sounds from a MIDI-equipped digital synthesizer. Yamaha's DX-7 is clearly the MIDI synthesizer the pros prefer—it's the synthesizer that got there fastest with the mostest and won industry allegiance. The vast majority of custom patches and voice libraries that run on the Apple II are written specifically for the DX-7.

Notation/Printing Software

Passport Designs, one of the pioneers in Apple music systems, has forged ahead with new Apple II notation/printing software, rather than follow the steady stream of developers who are moving such applications to the Macintosh. Passport's most recent releases are definitely worth the effort. Polywriter Utilities augments the power of the Polywriter Music Printing System by converting graphic files into sequencer files on Passport's MIDI/4, MIDI/4-Plus, and MIDI/8 sequencing/editing products. Moreover, Polywriter Utilities prints MIDI/4 sequences in standard music notation.

The venerable Apple II is still the company's musical workhorse, despite its printing liabilities.

Leadsheeter is Passport's inexpensive alternative to Polywriter. For just $99, Leadsheeter takes care of things such as note division, ties, and flags while converting your Apple compositions into dot-matrix sheet music. Leadsheeter handles all time and key signatures and can put lyrics beneath the staff.

The Great Mac Defection in music-notation/music-printing software is likely to continue. The Mac obviously eclipses the Apple II in both speed and graphics elegance. (Those "note-hanging" programs such as Music Construction Set are just too bloody slow on the Apple II). Nonetheless, software developers cannot totally ditch the Apple II as a notation and printing machine. The venerable II is still Apple's musical workhorse, despite its printing liabilities.

Surveying Music Education

The Apple II music-education genre has tapered off somewhat since Freff's report ("Opening Musical Vistas") in the November 1984 issue of *A+*, but Passport Designs is still hanging tough in a software niche that may not heat up again for a few years (until grade schools start enrolling some of the "Yuppie Puppies" being born right now). Meanwhile, Passport's latest baker's dozen of music-instruction diskettes aims for the upper end, those high-school and college students who somehow slipped through the lower grades without studying chord inversions and jazz harmonies. Each of the 13 new software titles was developed by Electronic Courseware Systems for distribution by Passport, and the product names do sound quite edifying: Keyboard Blues, Keyboard Note Drill, and so on.

But MIDI Age ingenuity really reaches new heights with Xanadu International's Musicom music-theory and ear-training software series for the Apple II. In addition to giving youngsters the de rigueur dose of diminished-ninth chords and funny looking rests, this software series actually lets kids croon into a microphone attached to an Apple expansion card. If the kid can't cut it in the Caruso department, the software gives an on-screen message indicating too sharp or too flat. (Teachers, take note: It doesn't have any on-screen prompts for "Too excruciating" or "Too late to take that sabbatical that you have been contemplating.")

Finally, the MIDI momentum has created a real need for more adult-education books and videocassettes that demystify MIDI and "Synth-Speak" by providing glossaries, pictorials of sample hookups, and some simple how-to's. If you prefer the print medium, the quarterly *Roland User Group Magazine* is both technically lucid and aesthetically pleasing. Ferro Productions/SynthArts sells two videocassettes—each listing for $129.95, in both VHS and Beta formats—entitled *Secrets of Analog and Digital Synthesis* and *Making the Most of MIDI*. Rock legend Frank Zappa has hailed "Secrets" as a taped tutorial that explains musical hardware and software "in a way that even guitar players and record producers can understand."

Or maybe even we Apple II dilettantes, Frank. You know, the more these MIDI matters dominate the marketplace, the more we're forced to acknowledge that—MIDI matters. ✚

(For a guide to music software and a vendor directory, see the sidebar immediately following this article.)

Larry McClain is a Los Angeles freelance writer and musician, formerly a staff writer for Popular Computing *and editor of* Hard Copy.

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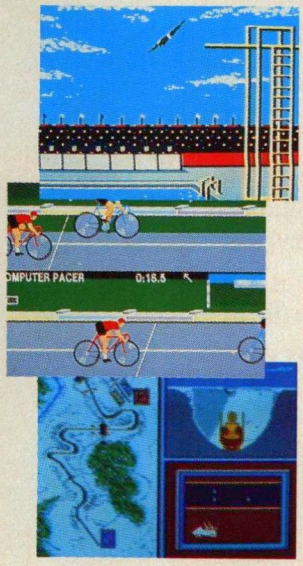

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BUYERS' GUIDE TO APPLE II MUSIC SOFTWARE

This roundup of new and noteworthy music products for the Apple II is intended to be a reader service, not a definitive directory. There may be some omissions, and inclusion in this list doesn't imply an endorsement.

Unless otherwise noted, all the products in the list can operate with the Apple II Plus (upgraded to 64K and 80-column display in some cases) and Apple IIe. Since Apple IIc/MIDI interfaces have been available only for a few months, check with product vendors to find out about IIc compatibility.

IMPORTANT NOTE: MIDI-interface requirements vary a lot from product to product, so contact your vendor or authorized dealers before making a purchase.

SEQUENCER/EDITOR SOFTWARE

MUSE (MIDI User's Sequencer/Editor),
8-track, 6000-note sequencer and editor
Roland Corporation

MIDI/8 Plus ($149.95) and MIDI/4 Plus ($99.95)
8-track and 4-track sequencer/editor software
Passport Designs

Master Series (Studio 2), $225
8-track sequencer/editor with digital delay
Music Digital

Texture, $199
8-track sequencer/editor written by recording artist Roger Powell (Utopia)
Cherry Lane Technologies

Connections, $149
8-track sequencer/editor
Cherry Lane Technologies

MIDI Sequencer, $150
16-track sequencer/editor
MusicData, Inc.

VOICE LIBRARIES CUSTOM-VOICING SOFTWARE

MIDI Soundfiler, $75
All-purpose voice library/editor
MusicData, Inc.

Floppy DOS (subscription prices: $50, first disk; $240 for six-month subscription to monthly Key Clique releases)
Ongoing series of Yamaha DX-7 voice-library diskettes from professional synthesizer programmer Bo Tomlyn
Key Clique, Inc.

DX-Heaven, $149
Voice library/editor for Yamaha DX series of synthesizers
Cherry Lane Technologies

DX Pro, $195
Yamaha DX-7 voice library/editor
Available through authorized Yamaha dealers

CZ-Rider, $149
Voice library/editor for Casio's CZ series of synthesizers
Cherry Lane Technologies

DATA series of synthesizer voice-library/editor programs:
Data 6 (for Sequential Circuits Six-Track), $75
Data 7 (for Yamaha DX-7), $125
Data 11 (for Yamaha RX-11 drum machine), $75
Data ODX (for Oberheim DX drum machine), $90
Performance 7 (for "live" performance of the DX-7), $125
Mimetics Corporation

MUSIC-NOTATION AND PRINTING SOFTWARE

Leadsheeter, $99.95
Outputs treble-clef/piano-format sheet music on dot-matrix printers that can produce graphics
Passport Designs

Polywriter Utilities
Enhances Passport Design's Polywriter score-printing software by improving editing features; can also convert Polywriter and Leadsheeter graphic files into MIDI/8 and MIDI/4 Plus sequencer files
Passport Designs

MUSIC-EDUCATION SOFTWARE

MIDI Musicware series
13 music-instruction programs (including Keyboard Blues and Keyboard Jazz Harmonies), with prices from $39.95 to $79.95
Developed by Electronic Courseware Systems, Inc.
Distributed by Passport Designs

Musicom Series, Part A—Ear Training/Sight Singing (Contact the manufacturer or your dealer for prices.)
Part B—Keyboard Fundamentals (33 diskettes in all)
Xanadu International Ltd.

MIDI INTERFACES

All-In-One Variety

Passport MIDI Interface (with drum sync), $149.95
Passport MIDI Interface (tape and drum sync), $199.95
Passport MIDI Pro Interface (for Apple IIc and Macintosh), $249.95
Passport Designs, Inc.

M-350 MIDI Interface, $129 without tape sync, $199 with tape sync
Music Digital

Interface Units Requiring Separately Purchased Apple Cards

MPU-401 MIDI Processing Unit, $199
Roland Corporation

MIDI-Mate, $199.50
Hybrid Arts

Apple/MIDI Interface Cards Requiring Separately Purchased Interface Units

MIF-APL Interface Card, $120
Roland Corporation

Apple IIc MIDI Interface Card, $139
J.L. Cooper Electronics

TUTORIALS

The SynthArts videocassette series (*Secrets of Analog/Digital Synthesis* and *Making the Most of MIDI*)
Available in both VHS and Beta videocassette formats, $129.95 each
Ferro Productions/Cherry Lane Technologies

MIDI Primer (textbook—$15)
Cherry Lane Technologies

Using MIDI and Related Interfaces (textbook—$9.95)
Ferro Productions

In Sync newsletter
MusicData

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Novation Apple Cat 212 Upgrade	220.00
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Prometheus Promodem 1200 Apple Incard 300/1200 Baud	289.00
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Zoom Modem IIe (Auto Dial/Auto Answer 300 Baud)	119.00

Apple Accessories:

4164 150ns Ram Chips Each	1.29
16k Ram Card, Apple II+	35.00
AST Multifunction Board With Clock, Modem Port	175.00
ALS Zengine CPM Card, Includes CPM 2.2 Diskette	109.00
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Apple Brand Disk Controller (Uni/Duo/Disk Controller)	50.00
Digitek 80 Column Card Apple II+ Version	49.00
Digitek Graphics Printer Card with 6 ft Cable (Specify Printer)	30.00
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Orange Micro Buffered 64k Grappler Plus	150.00
Orange Micro Serial Grappler Plus	79.00
Orange Micro Hotlink	59.00
Kensington System Saver	65.00
Super Cooling Fan, 2 Outlets/Surge Protector	24.00
Koala Pad Plus w/Software, Apple IIc/IIe Version	69.00
Koala Pad Plus w/Software, Apple II+ Version	72.00
Kraft Joystick Apple IIc/IIe Version	35.00
Kraft Joystick Apple II+ Version	35.00
Generic Apple Super Serial Card With Cable	89.00
Generic Joystick, (Kraft Clone), Connectors For Apple IIc/IIe/II+	25.00
Generic Parallel Printer Card with 6 Foot cable	39.00
SMT Extended 64k 80 Column Card, (IIe Only, 3 yr warranty)	59.00
Thunderclock	109.00
Videx 80 Column Card with Softswitch	199.00
Videx 160 Column Ultraterm Enhanced	199.00

Apple Disk Drives:

Apple Uni-Disk Drive W/Controller/Prodos	190.00
Shugart Apple II+/IIe Disk Drive	119.00
Mitac Apple IIc Disk Drive	119.00

Monitors:

Sakata Sc-100 Color Monitor Med. Res. Composite	175.00
Sakata Sc-1000 Amber Monitor	89.00

Printers:

Legend 808 100cps Printer	189.00
Okidata 192 (160 CPS,NLQ)	349.00
Okidata 192 (160 CPS,NLQ) IIc Mac Version Serial	389.00
Okidata 193 Printer 15" Carriage	499.00
Okidata 182	279.00
Star Micronics SG-10	219.00
Star Micronics SG-15	379.00
Juki 6100 Daisy Wheel	359.00
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Ribbons:

C.Itoh 8510/7500/1550	5.00
Okidata 92	2.00
Epson FX/RX/MX/80 Ribbon	5.00

Software:

Appleworks	185.00
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Springboard Newsroom Apple Version	35.00
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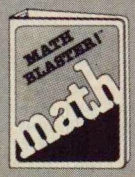

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CCS, 7711 or 7710-A Interface, ea.	$ 115	$ 95
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CIRCLE 129 ON READER SERVICE CARD

A Glossary of Terms

BY STEVE ROSENTHAL

AppleWords

For use with the four MIDI music articles in this issue

ADSR
A term used both for the most common way of shaping synthesized sounds and for the circuit that carries out the process. ADSR stands for four stages in the production of a sound: attack, decay, sustain, and release. Changing the ADSR settings changes the tonal quality of a note but not its basic pitch.

ANALOG
As applied to synthesizers, ones that produce their basic tones using circuits that operate with a continuous series of values instead of the discrete steps used with digital methods. Even analog instruments, though, can have digital controls and interfaces.

ARPEGGIATOR
A circuit that continues a note pattern or chord, often with a selectable rhythm or progression.

BEND
To change the pitch (frequency) of a note, either to produce special effects or to tune up with notes from another instrument. Pitch-bending facilities vary widely, ranging from the ability to smoothly ramp the pitch up and down by more than an octave to settings that merely move the pitch up and down a stated fraction of a tone.

CHORUS
A feature that lets a synthesizer produce several related voices (notes) at a time, with the added notes following the main melody or chords but slightly shifted in tone or phase. The effect is somewhat as if a chorus, rather than a soloist, were producing each note.

DIN CONNECTOR
A round connector such as that used on the IIc, as well as on many tape recorders and home video cameras. It is a common European-style connector, made according to German industry (DIN) standards. MIDI uses DIN connectors for its cabling.

ENVELOPE
The shape of the waveform that makes up a sound. Two notes of the same basic pitch sound very different if they have different envelopes. You can generally modify envelopes with filters, mixers, and modulators. It takes some skill to get the desired sound.

LIBRARIAN
A program or feature that lets you store patches (groups of settings) or digitized sounds in a larger memory and recall them. One advantage of using Apple II or Mac as a MIDI controller is that the computer is already engineered to store up and recall blocks of data and that its more visual interface makes it easy to identify what you've stored.

MIDI
An industry-standard connection for computer and digital control of musical instruments and devices. MIDI (Musical Instrument Digital Interface) provides a way to digitally record, play back, and synchronize the settings that are needed in order to control sound-producing devices. You can buy MIDI boards for both the Apple II and the Macintosh computers.

PATCH
A group of settings for a synthesizer or similar instrument saved as a unit, or the memory area where these settings can be stored. Synthesizer players sometimes refer to these as programs, but they don't necessarily have any sequence of steps. An Apple or other personal computer with a MIDI connection can be used to store and edit large numbers of patches, and you can buy prewritten patches for popular synthesizers on Apple disks.

POLYPHONIC
Involving more than one voice (note) at a time. Most synthesizers and keyboards are polyphonic, but the maximum number of voices varies with the brand and model.

PUNCH IN AND PUNCH OUT
A feature of some MIDI systems that allows you to switch from a previously recorded or automatic sequence to your own playing and back. When provided in the software for a computer running as a recorder and sequencer, this feature lets you edit your stored renditions.

SAMPLING
A technique for creating sounds by first capturing a digital recording of an existing sound and then manipulating it. Adherents claim that it allows the production of sounds that can't be created by synthesizers, especially high-quality renditions of the human voice and acoustic music. Several sampling boards are available for the Apple II family.

SEQUENCER
A computer or controller that issues instructions to programmable musical instruments. An Apple II or Mac can act as a

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CIRCLE 130 ON READER SERVICE CARD

sequencer if it has the right software and a MIDI interface.

SMPTE

Short for Society of Motion Picture and Television Engineers, a group that, among other efforts, defined a time-coding system used on almost all professional videotape and film. Some digital music systems can also recognize SMPTE coding and synchronize their outputs to the SMPTE time signal.

STEP TIME

Taking one step of a digital music sequence at a time for recording, editing, or playback. It's the digital equivalent of slow or stop motion. One advantage of using a computer as a MIDI controller is that most programs allow step-time editing.

SYNTHESIZER

A musical instrument that electronically creates and shapes sounds according to changeable settings. Along with allowing you to control such basic sound qualities as pitch, loudness, and duration, most synthesizers allow you to alter the tonal qualities of each note. Most synthesizers are now made with MIDI connections, which means that they can be controlled through an Apple II or Macintosh with a MIDI board.

TRACK

A stored channel of information, particularly one that can capture a single musical voice. The term is used both for the channels on traditional (analog) tape recorders and for sections of memory in digitally based systems.

TRANSCRIPTION

Putting music into written form, particularly into standard musical notation. Some programs for the Apple II and Mac can do a creditable job of transcription as parts of MIDI systems, but so far their capabilities are far short of those of a professional musician.

VOICE

1. A succession of notes played by the same device or the collection of circuits that produces those notes. It's equivalent to a track in a multitrack tape recorder or a single part in a multipart musical score. 2. A particular tonal quality or timbre. Also, as a verb, to enter the settings that will cause an audible note, particularly a note with a chosen tonal quality. Voicing, on synthesizers, is also called patching. +

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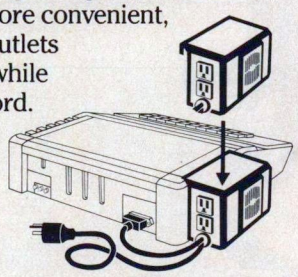

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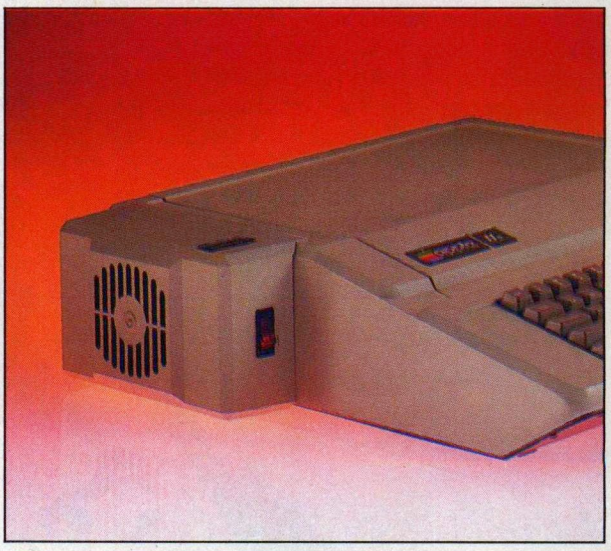

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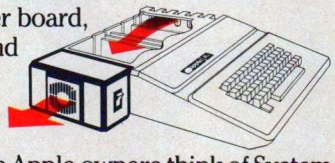

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CIRCLE 134 ON READER SERVICE CARD

SOFTWARE *BY CHARLES A. RUBIN*

If you've been making a wish list of features you'd like to see in an Apple II word-processing program, take a look at SSI Software's new Apple version of WordPerfect. Your wish list will certainly get a lot shorter, and it may disappear completely.

Since SSI came out with its IBM PC version of WordPerfect in 1983, the program has become one of the top-selling word-processing programs in the IBM world. SSI hopes to duplicate this success with WordPerfect for the Apple by incorporating nearly every feature that has made the original program so popular. The result is a powerful word-processing package.

Its wealth of features prevents WordPerfect from being the fastest program on the block to operate or the simplest to learn, but the trade-off between power and ease of use will be worth it for those who require an advanced word processor.

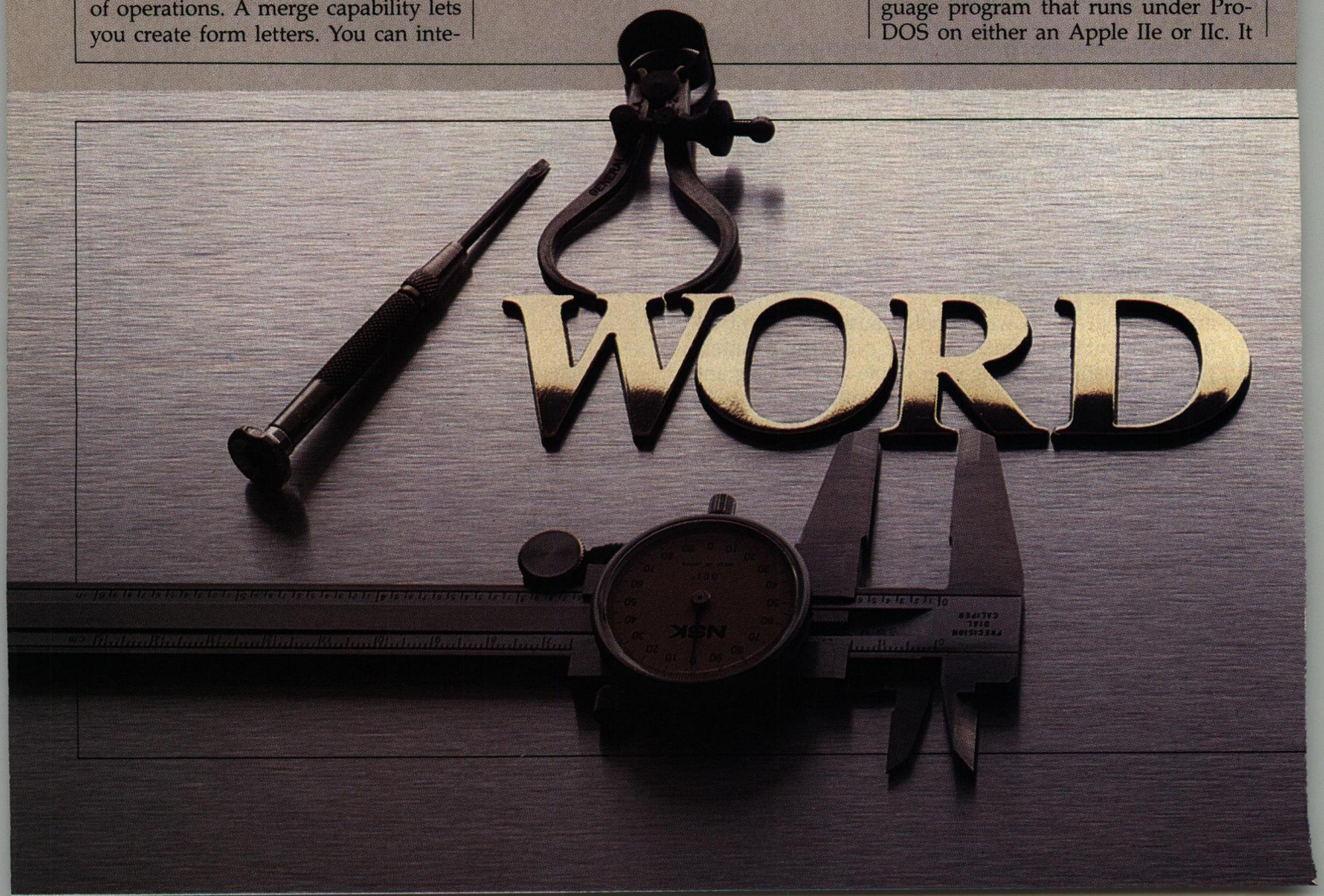
THE BIG PLUSES

WordPerfect combines many of the desirable features its competition offers and goes beyond them all in some ways. It uses a virtual-memory system, so you can create files as large as your available disk space (up to 16 megabytes on a hard disk). It features keystroke macros that let you automate any WordPerfect operation or set of operations. A merge capability lets you create form letters. You can integrate an optional spelling checker into the program, so you don't have to quit WordPerfect to check the spelling of a document. Documents can be up to 250 characters wide, and the program scrolls text horizontally so the proper material is always in view. You can print a file from disk while editing another file in memory. And, finally, WordPerfect isn't copy-protected, so you can run the program from a hard disk or UniDisk 3.5.

Beyond these highlights, the program offers several advanced formatting and file-utility features, and it works with any printer you can name. My copy of WordPerfect came with built-in configurations for 31 printers and more than a dozen interface cards, and SSI says its goal is to add configurations for every printer in existence. At the time of this writing, SSI's list of printers that work with the Apple version is up to 42, and the IBM version of WordPerfect now works with more than 100 printers.

SYSTEM REQUIREMENTS

WordPerfect is an assembly-language program that runs under ProDOS on either an Apple IIe or IIc. It



can run on a 64K system, but it uses program-overlay files that move into and out of memory as necessary on a 64K machine, so the system will run relatively slowly. On a 128K machine, the overlays are loaded into the extra RAM, and you don't notice the overlay swapping.

The program can also run on a single-drive system, although two drives are recommended. The package includes four disks: a program disk, a utility disk (which contains extra printer- and interface-configuration files, among other things), a disk filled with tutorial files, and a formatted data disk. The data disk contains the program's Help file and some printer-test files, but you can use any standard ProDOS data disk.

The program's manual begins with step-by-step instructions for copying the four disks onto single-drive, two-drive, and hard-disk systems. The manual contains no mention of Apple's new UniDisk 3.5 drive—it assumes you're working with 5¼-inch floppy drives or a hard disk. SSI did take into account the growing popularity of RAM-expansion cards, however, and the program comes with utility software that lets you set up a RAMdisk for storing data files if you have an Applied Engineering RAMWorks card.

STRUCTURED LEARNING

The WordPerfect manual is organized to accommodate first-time users. The "Getting Started" section shows you how to copy the program and other disks and how to define a macro that selects the printer and interface card you want to use. The program can store up to three printer and interface-card configurations at a time, and you can choose among them when you print a document. The initial printer-selection macro, called Startmac, selects a printer and interface card automatically when you load the program.

Once you've made copies of disks and set up the printer-selection macro, you can move into the "Learning" section of the manual, 11 lessons that walk you through many of the program's features, including most editing and formatting features and an overview of the merge function. This step-by-step approach gets you using program functions quickly, but it doesn't provide an overall understanding of how the program works or how it is organized—you have to refer to the manual's reference section for explanations of individual program features.

A reference section follows the tutorial and explains every program feature and command in alphabetical order. The separate sections that follow give detailed explanations of the spelling program, the macro capability, and the merge function. Merging and macros are particularly powerful features in WordPerfect. A merge file can contain up to 64,000 different fields of information, so this function goes way beyond simple form letters. The merge section offers some suggestions for different uses of this feature.

The macro function gives you programming abilities without a programming language such as Apple Writer's WPL. You define macros by turning on the Macro Definition function and naming the macro. (Macros can have names up to 15 characters long, or you can choose to store them

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WordPerfect begins with an editing screen that shows only the line and column position of the cursor.

under open-apple/letter-key combinations.) To enter a macro, you simply type the operation you want to save as a macro. When you've completed the operation, you turn the Macro Definition feature off.

You can chain macros to one another, and the chaining can be conditional so that linked macros begin working only if certain conditions exist. The "Special Features" section of the manual describes advanced macro uses and offers examples of chained and conditional macros. A chained macro can retrieve a file and then print it, for example, and a conditional chained macro can retrieve a file, search for a phrase, and then print the file (if the phrase is present) or add the phrase to the file and then print the file (if the phrase is not present). Because macros can be conditional, you can construct menus within the program that perform certain program functions. Input from a menu can trigger a macro. If you type Option A, for example, Macro A activates, and so on. The "Special Features" section also includes an example of a menu system.

USING WORDPERFECT

WordPerfect is an example of a "modeless" word-processing program. Most word-processing programs begin from a menu that lets you load or save files, format disks, list files, or create new documents, but WordPerfect begins with an editing screen that shows only the line and column position of the cursor. The bottom line of the screen shows the current program status—one-letter symbols indicate whether features such as boldface or underlining are turned on, and a list of available program options appears when you type a command. You control every program feature from this screen.

To create a document, you simply begin typing. The program formats text on the screen dynamically, so margins, centering, line spacing, and page breaks appear as they will when the document is printed. Other format enhancements such as boldface, underlining, different pitch settings, or proportional spacing don't appear as printed, but they show up in reverse video so you know they're there (see figure 1).

One thing about the appearance of text on the screen that you have to get used to is the dynamic formatting. Unlike AppleWorks or PFS:Write (which update the formatting of the entire screen whenever you make a change), WordPerfect updates the format of text only above and to the left of the cursor's position, not below

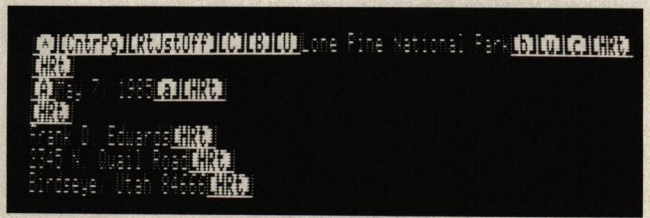

Figure 1: A file on the screen showing formats. Format enhancements such as boldface and underlining don't appear as printed, but show up in reverse video so you know they're there.

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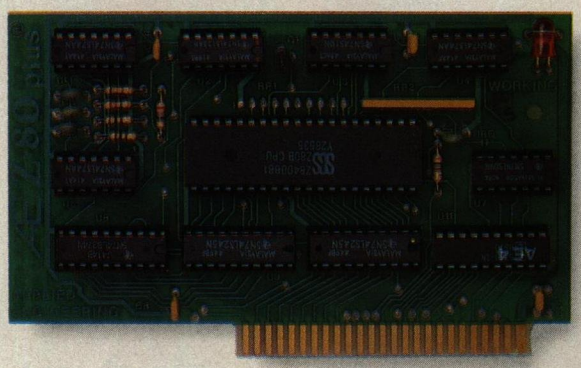

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The Accelerator IIe boosts your productivity, letting you complete your tasks 3 times faster. That means you get more work done—or more time to play. It's the perfect complement for your power software and hardware (especially memory expansion boards!).

How does the Accelerator IIe speed up the performance of your Apple? By combining a high performance processor together with high speed memory.

The 65C02: High Performance Engine

The heart of the Accelerator IIe is its 65C02 engine, running at a pulse pounding speed of 3.6 MHz. The Accelerator effectively replaces the Apple's modest 1 MHz 6502, giving your Apple a performance increase of up to 3½ times faster on most applications.

Memory

It takes more than just a fast engine to Accelerate your Apple, it takes fast memory too. The Accelerator IIe's got it—80K of 120 n.s. high speed RAM! 64K of this memory replaces the slower Apple system memory and language card. Your Apple program automatically executes out of the Accelerator's high speed RAM, giving your software added performance over the slower Apple memory. An additional 16K of ROM emulation memory loads the contents of Apple ROM into the Accelerator's high speed RAM. This gives programs which use Apple ROM, like Applesoft BASIC, an added turbo boost! The Accelerator IIe's on board memory approach ensures that *all* programs will run fast, contrasting dramatically with the hit-or-miss approach employed by the competition's memory caching scheme.

But on board memory is only half the story. Coupled with memory expansion boards for high speed data storage and retrieval, the Accelerator IIe transforms your Apple into a high power machine with performance rivaling the IBM PC!

Software Compatibility

The Accelerator IIe boosts your Apple's performance without sacrificing compatibility. It's compatible with virtually all Apple software including power applications such as the BPI and Manzanita accounting series, Multiplan, Apple Pascal, and much, much, more. And if you find you're running too fast, the Accelerator IIe has a special slow down feature to let you down shift to normal Apple speed.

Hardware Compatibility

The Accelerator IIe is right at home with the optional equipment in your machine including such high performance accessories as the Titan RAM boards, 80 column cards, the Grappler, Ramworks, Apple's Profile hard drive, modems, clock cards, mouses, and more.

Transparent Operation/Ease of Installation

Once installed, the Accelerator IIe's operation is completely transparent. No preboot disks or procedures required. Your Apple will drive the way it always has—only faster! Speaking of installation—it's a breeze! A simple procedure configures the Accelerator for your Apple system. After that pick a slot, any slot, and plug it in. That's all there is to it. Then turn on your Apple and floor it!

Backed by the Industry

The Accelerator IIe is Apple's reason number 3 of their 10 reasons to buy an Apple IIe as stated in their ad campaign run in Time, Newsweek, People, Omni, and Sports Illustrated. Personal Computing had this to say about the Accelerator IIe: "A year's experience with a Titan Accelerator board has renewed my appreciation of the Apple's seemingly endless upgrades. My hopped-up Apple works as reliably and simply as ever; yet its responsiveness makes it feel like a state of the art 16-bit machine."*

Backed by Titan

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CIRCLE 180 ON READER SERVICE CARD

The disadvantage of this system for newcomers is the lack of logic in the organization of sets of commands.

and to the right of it. If you insert words in a line, therefore, the line changes (to the right of the cursor) won't reformat until you use the Rewrite command to reformat the whole screen. You may find this method disconcerting at first, because inserted words don't wrap around to the next line—they march off the screen to the right out of view, and they don't reformat until you use the Rewrite command.

The advantage of this modeless control system is that you don't have to remove an active file from the screen when you want to print a file from disk, format a disk, create a subdirectory, or perform other utility functions. In some cases (listing files on the disk, for example), the active file temporarily disappears from the screen, but it always returns when you have completed the current activity.

The disadvantage of this system for newcomers is the lack of logic in the organization of sets of commands. Programs that begin from a menu or use separate file-management and formatting modes have a built-in organization that helps you remember where certain groups of functions are in the program. In WordPerfect, on the other hand, the commands are all bunched together and controlled by the open-apple and solid-apple keys, in combination with the keys in the top row of the keyboard. The program's developers made no attempt to place related functions together in the top row. The Cancel command is next to Search, which is next to List Files, which is next to Boldface, for example.

You'll therefore spend a lot of time referring to the command template that SSI supplies to help you remember where commands are, or displaying the on-line help list (see figure 2). The only organizing system is that you control all the editing/formatting/utility functions with open apple or solid apple and one of the top row keys and handle all the cursor movements with the solid-apple key and the letter keys on the right side of the keyboard below the top row.

Even when you use the template for the top-row keys, however, you don't easily become familiar with the options under each labeled key. After all, there are only 14 keys (28 functions, because each key works with both the open and solid apple) to control some 126 program features and commands. Pressing most key combina-

```
Feature                                  Function Key

Advance Up                               [SA]-7
Advance Down                             [SA]-7
Align-Tabs                               [OA]-Esc
Alignment Character (Line Format)        [SA]-5
Append Block (Move)                      [OA]-9

Back (List Files)                        [OA]-3, Return
Binding Width (Print)                    [OA]--, 3 or 4, 1
Block                                    [OA]-B
Bold                                     [OA]-4

Press first letter of feature, or any key to see next screen (cancel to quit)
```

Figure 2: Help screen, which appears after pressing open-apple-?

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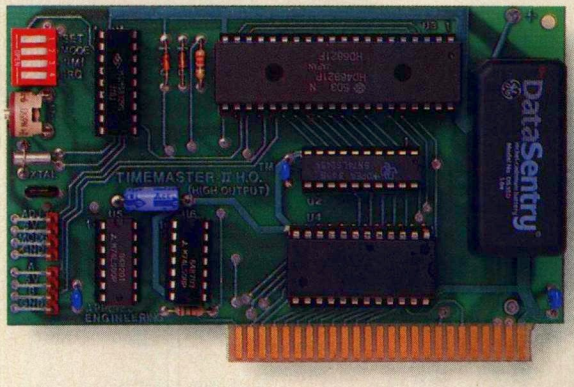

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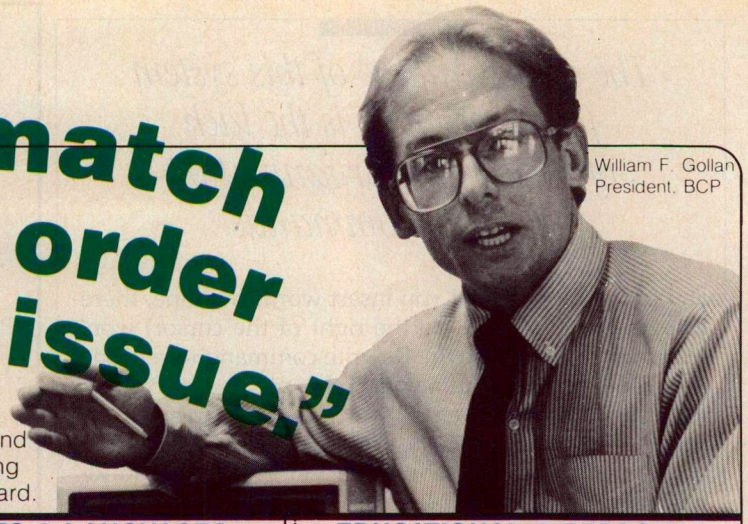

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tions reveals a menu of options, and those menus often reveal submenus with more options.

The sheer number of necessary keystrokes sometimes gets in the way of quick editing. To move data by a sentence, paragraph, or page, for example, you must type the Move command, and then choose Sentence, Paragraph, or Page from a menu.

If you want to work with a block of text other than one of these units, you must enter the program's Block mode. The total sequence of operations to move three words of text, for example, is open-apple-0 (enter the Block Selection mode); open-apple-9 (Move command), 1 (option to cut block), move cursor to new location, open-apple-9 (Move command), 4 (option to retrieve block), open-apple-0 (leave the Block mode). If you use some of the multiple-key operations frequently, of course, you can define macros to handle them much more quickly, but the going will be fairly slow until you've set up the macros you need most.

Another program feature that will slow users down somewhat is also related to the Move function. Whenever you cut text from a document, it is stored on disk in a temporary file, rather than in memory, which means that you have to wait for your Apple to save or load sections of text when you cut or paste them. Having a hard disk or a RAMdisk speeds this process up considerably.

One last area in which the program's power can be a drawback is in the formatting codes. You can enter 49 separate formatting codes into documents as you specify formats. These codes are normally hidden from view, but when you display them, the jungle of codes on the screen (in inverse video) can be mystifying. The manual does contain a listing of the codes and what they all mean.

FEATURES GALORE

These operational complexities are functions of the program's power, however, and WordPerfect has power to spare. Here are a few of the feature highlights:

Formatting

The program automatically numbers footnotes in the text and adjusts page breaks to accommodate footnotes. You can format alternating pages for left and right binding margins for two-sided printing. You can align text flush-right with two keystrokes and change text from uppercase/lowercase to all caps with one command. You can automatically insert the date at the cursor position (WordPerfect can work with clock cards, or you can store the current date manually).

The program can be set to suggest hyphenation of long words that have wrapped from one line to the next. You can set the pitch (including proportional spacing) as well as use different fonts on most printers. You can define two headers and two footers for each document and alternate them throughout the file. You can also center text vertically on a page with a simple command. Although the printer-control system is elaborate, you can enter your own printer-control codes for special printer

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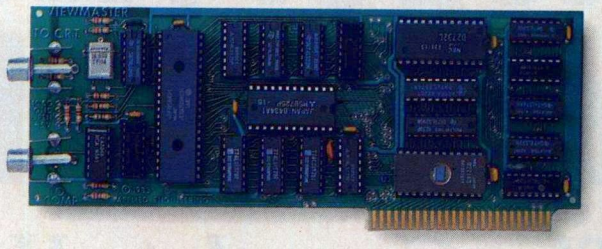

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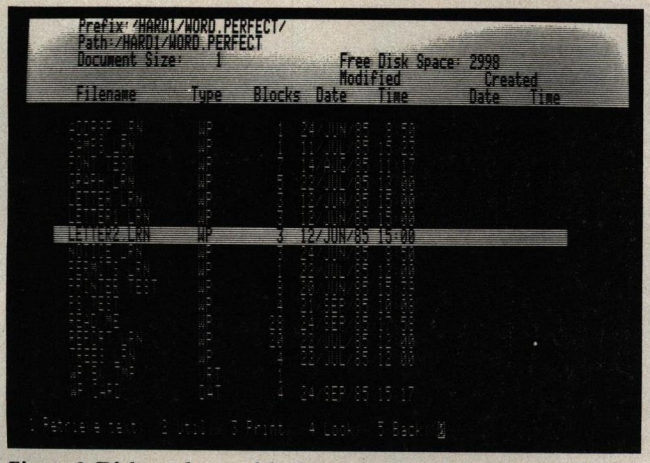

Figure 3: Disk catalog—with /Learn in drive 2, you use the List Files command to produce a catalog of the disk that shows each file's name, size, and date of creation and last modification.

features (such as shadow printing) that the program doesn't automatically offer.

Editing

A full range of cursor-movement commands take you to the beginning or end of a line, page, or document. The program searches forward or backward for text or format elements. You can also jump directly to individual page numbers in a document, whether you have specified page numbering or not.

Utilities

You can print one file from disk while editing another. You can also append a block of text from the current file to a file on disk or insert a file from disk anywhere in the current file. The Look feature lets you view the first page of every file on the disk without loading each one—a fast way to browse through files in a catalog if you've forgotten what they contain. The list of files shows the name and size of each file as well as the date and time of its creation and last modification. You can select a file to retrieve or insert by highlighting it in the list (see figure 3).

THE PRICE OF POWER

With WordPerfect, you get almost every conceivable feature you could want in a word-processing program, without any real limits on what you can do with them. The price you pay is somewhat slower operation. Once you've worked with the program for a while, you should remember your way around fairly well, but you'll still have to use two or three sets of keystrokes (or macros you've set up) to do many typical operations. Nevertheless, WordPerfect packs more punch than any other Apple word-processing program, at a reasonable price. ✚

Charles Rubin is the author of The Endless Apple *and* AppleWorks, *both from Microsoft Press. He writes about computing for various magazines.*

PRODUCT INFORMATION

WordPerfect
SSI Software
288 West Center Street
Orem, UT 84057
(801) 227-4020
List Price: $179; spelling checker, $30
Requires: Apple IIe or IIc, one disk drive (128K RAM and two drives recommended)

Your Apple IIc deserves the time of day.

Our IIc System Clock offers automatic time and date stamping, puts time, year, month, date and day of week right on your screen!

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Goodbye Floppies, Hello 20 MByte.

New from First Class Peripherals:
The Sider II 20 MByte Winchester Hard Disk Storage
and Tape Backup Unit for your Apple II+ or IIe

The New Sider II will bring your *Apple II+* or *IIe* to a significantly increased level of performance. You'll gain 20 MByte of storage plus the great advantage of being able to boot directly off the hard disk. Further, the Sider II disk is partitionable—you can allocate four operating systems on the same disk: Apple DOS 3.3, Pro Dos™, Apple Pascal, and CP/M®.

You require even more than 20 MByte storage? No problem. Simply daisychain with additional Sider units to increase mass storage.

NEW. B-Sider Tape Backup.

Backup copy capability is an important part of any mass storage system. Tape backup provides great advantages over floppies for archiving, and that's why First Class Peripherals has responded to user requests and now offers the excellent B-Sider 20 MByte tape backup unit. The new B-Sider is priced at only $695.

Features: Full image, operating system and volume backup and restore. File by file restore using wildcards. Backup to tape drive or to floppy disk. Will support Apple's Unidisk 3.5 800K floppy.

First Class Peripherals leads the industry in providing precisely the subsystems which users seek. Even more to your benefit are our prices—prices made possible solely because you buy direct.

The new Sider II, totally equipped to 'plug and play,' is only...

$995.

The new B-Sider tape backup is just...

$695.

And, the popular Sider 10 MByte hard disk is $695. By buying direct, you save—really save!

Quality? Reliability? Have no doubts First Class Peripherals subsystems are backed by Xebec, a respected computer industry leader. Further, our thousands of satisfied customers provide top evidence that we offer the finest, easiest-to-install Winchester hard disk subsystems available, and for the best price by far!

To complete this remarkable offer, Sider II, Sider, and B-Sider arrive with a money-back guarantee. Use any of the units for 15 days. If you are not satisfied, return it for a full refund. All units have a full one-year limited warranty and are supported by a convenient toll-free service and technical hotline you can call anytime.

Order Now. Say 'goodbye' to floppies and provide your system with new speed, convenience and performance. Use the provided coupon or, for faster service, order by phone and charge to your VISA, MasterCard, or American Express. (We also welcome your questions and technical concerns.) Call toll-free: **1-800-538-1307**
Extension 116.

II+ owners—Revision 7 or greater is required on your motherboard.

Apple and Pro DOS are trademarks of Apple Computer, Inc. CP/M is a registered trademark of Digital Research, Inc.

Sider and Sider II units include Winchester hard disk drive, Apple adaptor board, cable, complete installation software and documentation.

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SSI WordPerfect 1.0 and Stoneware DB Master programs. You receive your choice of One FREE!

Order your Sider II, Sider, or B-Sider now and you will receive the FREE program you select along with your order. SSI's WordPerfect 1.0. is the word processor program described by *InfoWorld* '...as close to perfect as you can get.' The Stoneware DB Master is acclaimed by reviewers and users as the best accepted Apple II DBMS program for business people and professionals. Both programs are leaders, and you can receive one free through this exceptional opportunity. Offer good thru April 30, 1986.

Yes, I'm eager to benefit from First Class subsystems performance.

Please send the item(s) indicated:
- ☐ 20 MByte Sider II @ $995 + $15*
- ☐ 10 MByte Sider @ $695 + $15*
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Total Cost: $_____
Residents of CA and NV please add appropriate sales tax.
Purchase order accepted. Please add $100 per unit.

I prefer to pay as follows:
- ☐ Check or money order (payable to First Class Peripherals) enclosed
- ☐ Bill the following credit card account:
- ☐ VISA ☐ MasterCard ☐ American Express

CARD #

*Shipping and Handling SIGNATURE

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For my Free Bonus Program I Select: ☐ DB Master ☐ SSI WordPerfect
Offer good thru April 30, 1986.

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CIRCLE 154 ON READER SERVICE CARD

BY MARY BOHANNON

NEW FOR THE APPLE II

THIRD-PARTY DEVELOPERS SUPPORT APPLE'S NEW PRODUCTS

COMPANY	PRODUCT	LIST PRICE	WORKS WITH	DESCRIPTION
ADVANCED LOGIC SYSTEMS 1195 East Arques Avenue Sunnyvale, CA (408) 730-0307	CP/M 3.01C	$99	● ■ ★ ▲	CP/M card for II, II Plus, and IIe; compatible with all CP/M software
	SpellWorks	$49.95	★ ▲	Mail-merge and spelling-check utility for AppleWorks
ARTSCI, INC. 5547 Satsuma Avenue North Hollywood, CA 91601 (818) 985-5763	Accounts Receivable	$199	■ ★ ▲	Accounting system
	Magic Window IIe	$149.95	■ ★ ▲	Word-processing program
	MagiCalc	$99.95	● ■ ★ ▲	Spreadsheet program
BAUDVILLE 1001 Medical Park Drive S.E. Grand Rapids, MI 49506 (616) 957-3036	Blazing Paddles	$49.95	★	Graphics package
	Prince	$69.95	★	Color-printing kit
	Take 1	$59.95	● ■ ▲	Animation package
BLYTH SOFTWARE 2655 Campus Drive, Suite 150 San Mateo, CA 94403 (415) 571-0222	Omnis 2	$295	■ ★	General-purpose single-file database
BPI SYSTEMS, INC. 3001 Bee Cave Road Austin, TX 78746 (800) 531-5252	Accounts Payable	$425	■	Helps a company maintain cash by providing detailed vendor activity and information
	Accounts Receivable	$425	■	Keeps information about customer histories, invoices, payments, etc.
	General Accounting	$425	■	Fully integrated general-ledger system that includes a basic subsidiary ledger for accounts receivable and payable and payroll
	Inventory Control	$425	● ■ ▲	Retail-oriented inventory-management system; maintains inventory balance and automates reordering process
	Payroll	$425	■	Automatically calculates payrolls and taxes and maintains information for reports
BRØDERBUND SOFTWARE 17 Paul Drive San Rafael, CA 94903 (415) 479-1170	Dazzle Draw	$59.95	■ ★	Illustration package
COMPUTER ASSOC. MICRO PRODUCTS DIV. 2195 Fortune Drive San Jose, CA 95131 (408) 942-1727	SuperCalc3a	$195	● ■ ★	Spreadsheet program with business graphics
CREATIVE PERIPHERALS UNLIMITED 22952 Alcalde Drive, Suite 160 Laguna Hills, CA 92653 (800) 533-8997 in CA (714) 770-3334	Time-Trax	$119.95	■ ▲	Time- and date-oriented scheduling with ProDOS clock
D.C. HEATH 125 Spring Street Lexington, MA 02173 (617) 862-6650	Quill	$150	■ ★	Writing program for grades 3–12 with four modules: The Planners, The Library, The Mail Bag, and The Writer's Assistant
HARRIS TECHNICAL SYSTEMS, INC. 624 Peach Street Lincoln, NE 68501 (800) 228-4091 in NE (402) 476-2811	Swine Record Keeping	$95	● ■	Complete management system for managers of purebred and commercial swine herds
	Cash Flow	$95	● ■	Farm-accounting program
	Corn/Soybean Management	$95	● ■	Includes five different programs, each dealing with a specific area of crop management

In the November issue of A+, we told you about some exciting new products from Apple, including the Apple II Memory Expansion Card that expands the II, II plus, and IIe's RAM up to one megabyte; the UniDisk 3.5 disk drive with 800K of storage on a 3-½ inch diskette; the ImageWriter II color printer; and the Catalyst 3.0 program selector that recreates the Macintosh desktop on the IIe and IIc. The following chart lists the products that are already making use of Apple's new offerings.

● APPLE II MEMORY EXPANSION CARD ■ UNIDISK 3.5 ★ IMAGEWRITER II ▲ CATALYST 3.0

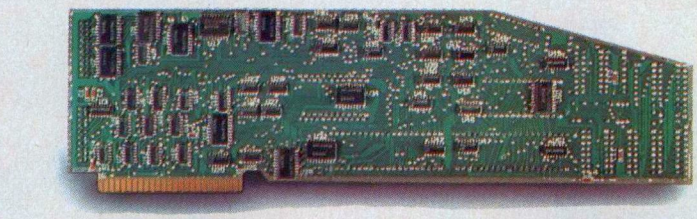
COMPANY	PRODUCT	LIST PRICE	WORKS WITH	DESCRIPTION
HARRIS TECHNICAL SYSTEMS, INC. 624 Peach Street Lincoln, NE 68501 (800) 228-4091 in NE (402) 476-2811	Crop Record Keeping	$95	● ■	Crop and field information for an unlimited number of topics, with graphs and user-defined reports
	Crop/Livestock Profit Projection	$95	● ■	Projects profits for any type of farm enterprise, based on expected production costs and market conditions
	Feed Formulation	$95	● ■	Lets you quickly analyze feed efficiency and mix with the lowest input cost
	Financial Management	$95	● ■	Contains five different programs, each dealing with an aspect of capital management
	Machinery Management	$95	● ■	Four-program product that provides information for machinery management
	Machinery Record Keeping	$95	● ■	Keeps track of machinery inventories, cost history, repair costs, etc.
	Swine Management	$95	● ■	Four programs: Swine Ration Analysis, Feeder Pig Analysis, Hog Selling Decision, and Fowl Productivity Calculator
HARVARD ASSOCIATES 260 Beacon Street Somerville, MA 02143 (617) 492-0660	DeskToppers for the Apple II	$49.95	● ■ ★ ▲	Desktop-accessory program
INTERNATIONAL SOLUTIONS 910 West Maude Sunnyvale, CA 94086 (408) 773-0443	Mouse Budget	$69	● ★ ▲	Keeps track of personal expenses for home or small business
	Mouse Calc	$149.95	● ■ ★	Spreadsheet with integrated graphics
	Mouse Desk		● ★ ▲	Macintosh-like desktop and program selector for the Apple IIe and IIc
	Mouse Word	$129.95	■ ★	Word processing with integrated telecommunications
INTUIT 540 University Avenue Palo Alto, CA 94301 (415) 322-0590	Quicken	$79	● ■	Check-writing and financial software
MANZANITA SOFTWARE SYSTEMS One Sierra Gate Plaza, 200-A Roseville, CA 95678 (916) 781-3880	Accounts Payable	$395	■ ▲	Business-accounting system
	Accounts Receivable	$395	■ ▲	Business-accounting system
	Businessworks	$395	■ ▲	Business-accounting system; requires System Manager ($95)
	General Ledger	$395	■ ▲	Business-accounting system
	Inventory Control	$395	■ ▲	Business-accounting system
	Payroll	$445	■ ▲	Business-accounting system
MECA 285 Riverside Avenue Westport, CT 06880 (203) 222-1000	Managing Your Money	$199.95	● ■	Personal-finance software
MEGAHAUS 5703 Oberlin Drive San Diego, CA 92121 (619) 450-1230	ReportWorks	$125	● ■	Creates reports, tables, and lists with AppleWorks
MINDSCAPE, INC. 3444 Dundee Road Northbrook, IL 60062 (312) 480-7667	ColorMe: The Computer Coloring Kit	$29.95	★	Picture disks for children
MONOGRAM 8295 South La Cienega Boulevard Inglewood, CA 90301 (213) 215-0529	Dollars and Sense upgrade	$119.95 $29.95	■	Personal-financial-management software

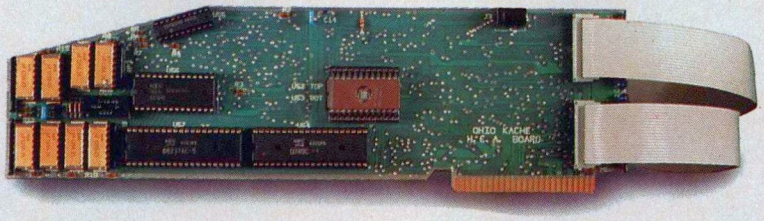
COMPANY	PRODUCT	LIST PRICE	WORKS WITH	DESCRIPTION
OMNITREND SOFTWARE, INC. P.O. Box 3 West Simsbury, CN 06092 (203) 658-6917	Universe 2	$69.95	● ■	▲ Adventure, strategy, role-playing game for ages 15 and up
ORANGE MICRO, INC. 1400 North Lakeview Avenue Anaheim, CA 92807 (714) 779-2772	Serial Grappler	$119	★	Graphics-capable printer interface
PINPOINT PUBLISHING 2823 Steinmetz Way Oakland, CA 94602 (415) 530-1729	Pinpoint	$69	● ★	Desktop-utility program for AppleWorks
QUALITY SOFTWARE 21601 Marilla Street Chatsworth, CA 91311 (818) 709-1721	Bag of Tricks 2	$49.95	● ■	Disk-diagnostic and problem-correction utility
QUARK, INC. 2525 West Evans, Suite 220 Denver, CO 80219 (303) 934-2211	Catalyst 3.0 upgrade	$149 $45	● ■	▲ Program selector with Macintosh-like user interface
ROGER WAGNER PUBLISHING, INC. 10761 Woodside Avenue, Suite E Santee, CA 92071 (619) 562-3670	MouseWrite	$125	● ■ ★	Macintosh-like word-processing program for Apple IIe and IIc
SCARBOROUGH SYSTEMS, INC. 55 South Broadway Tarrytown, NY 10591 (914) 332-4545	MasterType's Writer Your Personal Net Worth The Original Boston Computer Diet	$69.95 $79.95 $79.95	■ ★ ■ ★ ■ ★	▲ Word-processing program Home-financial-management program Program designed to help users lose weight
SENSIBLE SOFTWARE, INC. 210 S. Woodward, Suite 229 Birmingham, MI 48011 (313) 258-5566	Bookends Extended upgrade Sensible Speller upgrade	$124.95 $15 $125 $15	● ■ ● ■ 	▲ Electronic-card-catalog and bibliography-preparation program ▲ Spelling-verification program
SEVEN HILLS SOFTWARE 2310 Oxford Road Tallahassee, FL 32304 (904) 576-9415	QuickTest protected unprotected demo	 $155 $180 $5	● ■ ★	▲ Test generator that quickly creates exams for students
SIERRA ON-LINE, INC. P.O. Box 485 Coarsegold, CA 93614 (209) 683-6858	Homeword Plus Sierra Personal Financial Manager	$69.95 $219.95	● ■ ★ ● ■ ★	▲ Icon-based word-processing program Complete financial-management program
SOFTSYNC 162 Madison Avenue New York, NY 10016 (212) 685-2080	Accountant, Inc. Desk Manager	$299 $39.95	● ■ ★ ■	Small-business integrated-accounting package Desktop-accessory program
SOFTWARE PUBLISHING 1901 Landings Drive Mountain View, CA 94043 (415) 962-8910	PFS:Write PFS:File PFS:Graph PFS:Plan PFS:Report	$125 $125 $125 $125 $125	● ■ ★ ● ■ ★ ● ■ ★ ● ■ ★ ● ■ ★	Word-processing program Database manager Graph generator Spreadsheet program Report-preparation software
STREET ELECTRONICS CORP. 1140 Mark Avenue Carpinteria, CA 93013 (805) 684-4593	The AlphaBits II Business Card EchoWords 3.5	$119.95 $219.95 $49.95	★ ★ ■	Serial-printer/communications interface IIe printer-interface card with built-in pull-down menu for printer commands 4000-word dictionary with female-voice synthesis
THE LEARNING COMPANY 545 Middlefield Road, Suite 170 Menlo Park, CA 94025 (415) 328-5410	Magic Spells Robert Odyssey I	$34.95 $49.95	■ ■	Educational program for ages 6–12 that helps sharpen basic spelling and grammar skills Educational program, robot-construction set, and adventure game that teaches digital logic, for ages 13–college
UNITED SOFTWARE INDUSTRIES 1880 Century Park East, Suite 311 Los Angeles, CA 90067 (213) 556-2211	ASCII Express: The Professional	$129.95	■	Telecommunications-software package
WEEKLY READER FAMILY SOFTWARE 245 Long Hill Road Middletown, CT 06457 (203) 638-2400	Stickybear Printer	$39.95	★	Custom-designed-graphics program

THE KACHE BOARD GIVES YOU WHAT YOU'VE BEEN WAITING FOR TEN TIMES FASTER.

SPEED UP THE RESPONSE TIME OF YOUR MICROCOMPUTER BY AS MUCH AS 10:1.

Ohio Kache System's™ "Kache Board"™ effectively reduces the frequency of hard disk accessing, and consequently, the cause of most "waiting frustration"—mechanical latency. Apparent response time can be reduced by up to ten times since data requested already resides in cache memory. The Kache Board features a microprocessor that actually manages the operation of the cache memory buffers without drawing on your microcomputer's main processor. Data in cache memory is constantly purged to maintain 256K of the most frequently accessed data, combining the speed of RAM disk with the capacity of hard disk.





THE KACHE BOARD IS SUPERIOR TO RAM DISK.

The Kache Board offers performance that is superior to RAM disk for three primary reasons: data is automatically updated on the disk as it is changed, minimizing its vulnerability; data fetching from disk is transparent, eliminating the need to copy files; and cache memory retains only those files that are most frequently accessed, ensuring the greatest possible reduction in hard disk accessing.

SYSTEM COMPATIBILITY.

To date, the Kache Board is only compatible with Apple II+ and IIe systems with hard disk drive; however, boards for IBM, AT&T and Texas Instrument microcomputers are already in final testing stages and will become available later this year.

TECHNICALLY SPEAKING.

The Kache Board, a host adapter, is compatible with most Small Computer Standard Interface (SCSI) hard disk drives. Management of the cache memory buffers is carried out by a Z80 microprocessor which draws its power from an outside, custom tabletop power source (available as an optional purchase). Heat dissipation from the board amounts to approximately 6 watts.

SURFACE MOUNTED DEVICE TECHNOLOGY.

The functionality and intelligence of the 11" x 3¼" Kache Board is made possible by the technology of Surface Mounted Devices (SMD's). SMD's, tiny integrated circuits a fraction of the size and weight of conventional devices, are mounted on the underside of the board in a highly concentrated schema. This allows room on the top side of the board for the microprocessor, memory chips, custom integrated circuits and other components that, to date, are not available in SMD proportions.

EASE OF INSTALLATION.

The Kache Board is easy to install and can reside in any one of four slots: 4, 5, 6 or 7. In addition, a cable is provided for ease of installation to your 50 pin SCSI disk connection. The self-contained power source plugs into the Kache Board and relays power from any standard 110 volt electrical outlet.

AVAILABLE FROM MANUFACTURER ON A DIRECT MAIL BASIS.

The Kache Board is available from Ohio Kache Systems (OKS) on a direct mail basis only. A rigorous 48 hours of testing is completed on every unit prior to shipment. Nonetheless, Ohio Kache Systems offers a 90 day warranty on all components and labor as well as a 30 day trial period. If the Kache Board doesn't perform as we say it will, return it to us for a full refund.

ORDER TODAY

The OKS Kache Board comes complete, ready for installation in your Apple IIe or II+ for $695.00. You can order yours by calling toll-free:

800-338-0050

Phone orders may use Visa or MasterCard. To order by mail, write to the address listed below. For faster service use Visa, MasterCard, bank or certified checks. Please allow 18 days for delivery of shipments accompanied by money orders, company or personal checks.

Kache Board (256K)	$695.00
Optional Power Source	$35.00
6 Ft. Shielded, 50 Pin Extension Cable	$40.00
6 Ft. Non-Shielded, 50 Pin Extension Cable	$30.00

MasterCard VISA

Prices include shipping and handling. Ohio residents please add 5.5% sales tax.

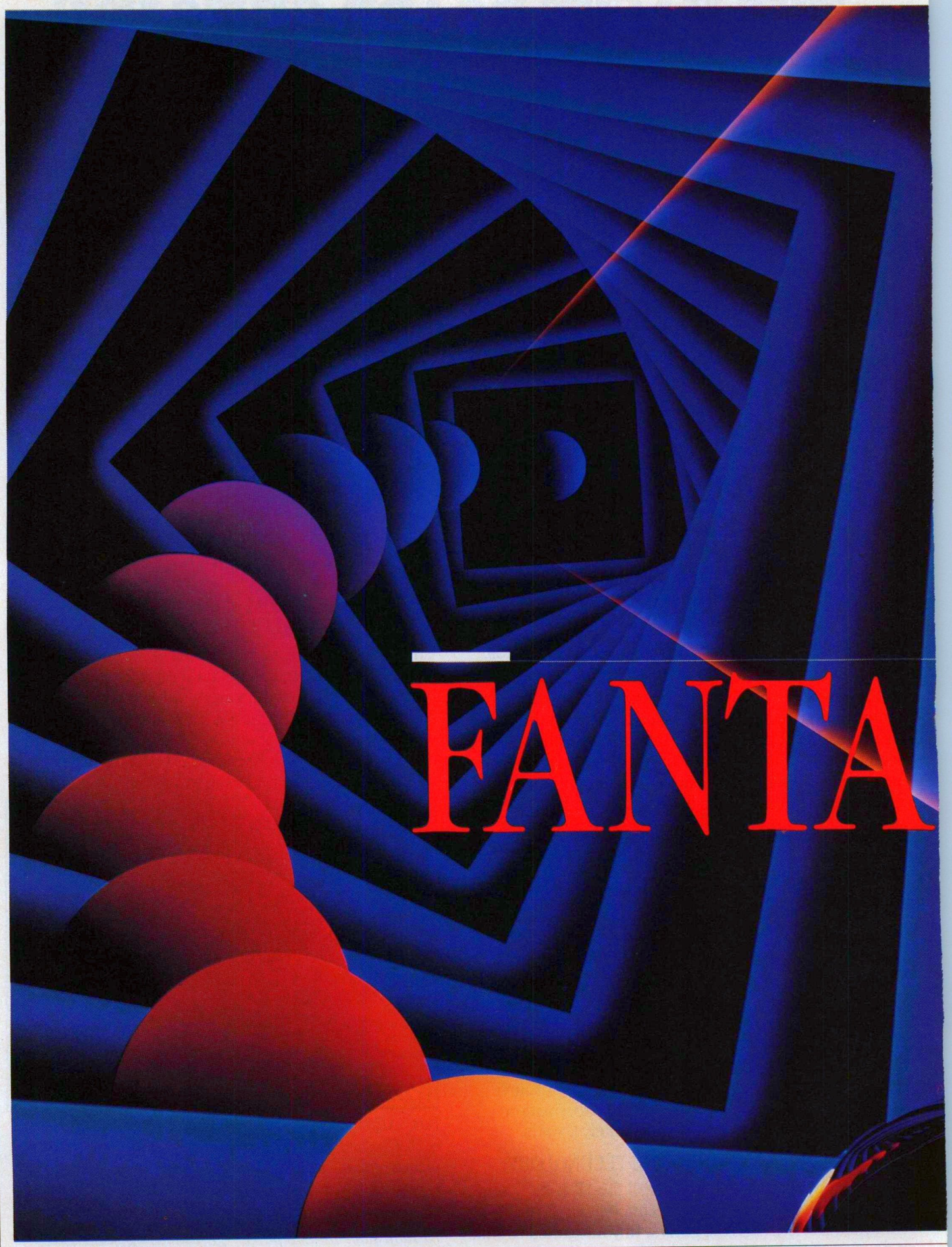
For further information on the Kache Board, Ohio Kache Systems Corp., or the compatibility of your hard disk drive, please contact us at

(513) 746-9160.

Ohio Kache Systems, Corp.
75 Tahlequah Trail, Dept. 11,
Springboro, Ohio 45066-1154

OKS

CIRCLE 178 ON READER SERVICE CARD



COURTESY BRODERBUND SOFTWARE, INC.

VISION

SOFTWARE *BY SUSAN JANUS*

A program that brings the fascinating world of computer-animated graphics to your Apple II

We've all been dazzled by them. From fiery network logos rocketing across the television screen to astounding film fantasies à la George Lucas, computer-animated graphics and special effects are one of the most visible and exciting developments of the electronic age. Never before have our eyes been treated to such a stunning variety of illusive, artful, and entertaining visual effects.

Now, thanks to Brøderbund Software, Apple II owners can create a bit of their own electronic wizardry, without spending millions of dollars on fancy equipment to do it.

FantaVision takes the Apple II to new graphic heights, giving users a machine that is geared for exploring the fascinating fantasy world of computer-animated graphics. Using the program, you'll be able to create and save your own colorful, high-resolution, animated movies, up to three hours long, complete with special effects. You can even create special movie disks to send to friends—they'll need an Apple, of course, to enjoy the show.

I like to think of FantaVision as Computer-Animated Graphics 101. It's a course that will appeal to the uninitiated as well as the experienced in a learning process that's fun every step of the way. You don't have to be an artist or a programming wizard to learn and enjoy FantaVision.

Take me, for instance. I'm a writer, so I spend 90% of my computer time using a word-processing program. Not very exciting, when you consider the capabilities of the machine. I'm not much when it comes to drawing and painting either, but I have always been intrigued by the likes of MacDraw and MacPaint. (Somehow pictorial endeavors are different when you're using a cursor and a screen.) Tell me I can animate my creations, then, and I'm ready to trade in my word-processing program—at least until the next deadline looms threateningly.

How It Works

One word of caution: FantaVision is fun and amazing, but it's no snap to learn, especially if you've never worked with computer graphics before. If instant gratification is what you look for in a program, pass this one by. FantaVision is in a whole different league from a Print Shop, for example. You can't toss the manual into a corner and whip a movie together in the first hour. At the risk of sounding like a junior-high shop teacher, I'll say that a thorough understanding of the manual is really essential to learning how to make good animations.

"Tweening" is the animation technique that breathes life into your FantaVision drawings. For example, if you draw a standing stick figure by plotting a series of points on the screen and then draw the same figure with both legs kicked straight out in the next screen, FantaVision will run the sequence of the two screens like two frames in a movie. If you run the sequence at a high speed, your stick figure will become a dancer kicking up his heels. By slowing the speed, you'll be able to see the intermediate (or be-*tween*) positions of the figure as the program runs through the sequence. You set the speed of your movies by controlling the number of intermediate frames you want visible. You simply press a number key, 1–7; 1 runs the fewest intermediate frames (giving you the fastest animation), and 7 shows the most intermediate frames (slowest animation).

"Transformation" is another technique that adds to FantaVision's magic. Draw a bird in frame 3, after your two stick figures. When you run the sequence at high speed, your dancer jumps and turns magically into—you guessed it—a feathered fowl. What you do with the poor creature after that is up to you, but if he gives you any trouble, you can always threaten to turn him into a frog the next time.

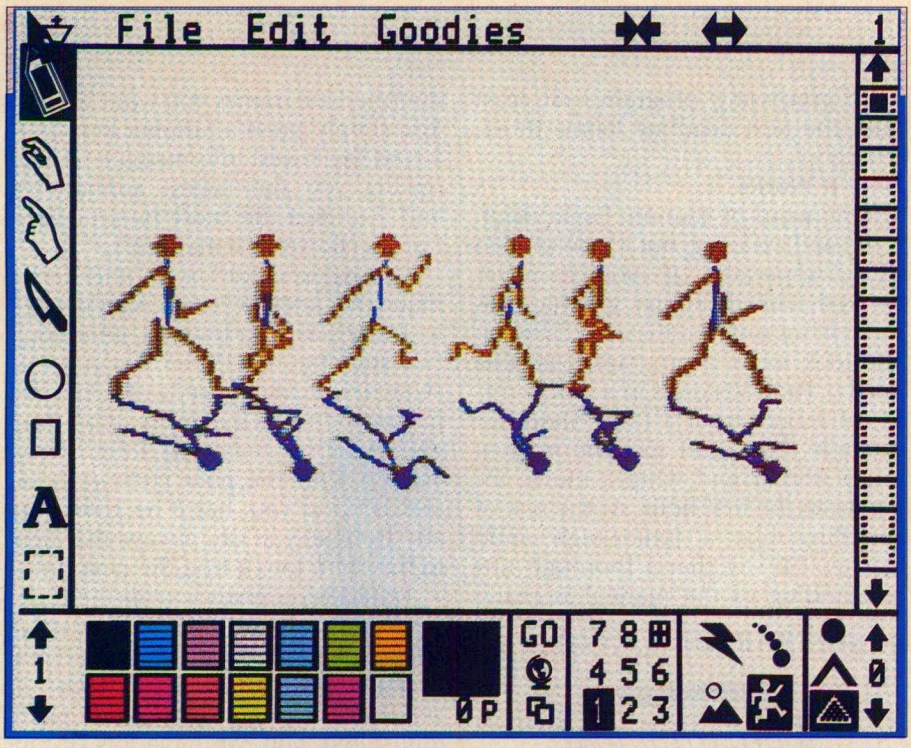
FantaVision gives you all the tools you need to create your own original animated sequences, complete with backgrounds and special effects. If you're feeling a bit lazy or just plain uninspired, you can have lots of fun just altering one of the many demo movies that come with the program.

Nuts and Bolts

To begin your animation efforts with FantaVision, you'll need an Apple II with at least 64K RAM; a disk drive; a color or monochrome TV or monitor; and a mouse, Apple Graphics Tablet, KoalaPad, or joystick. The best rendering I've seen of FantaVision's color and high resolution was produced by an Amdek RGB monitor. The RGB monitor I used was adequate but did not give the clarity of line and color the Amdek produces.

Cursor control for FantaVision is best with a mouse. The speed and efficiency of the program are quite impressive with the mouse, allowing you to get on with your production quickly and easily (once you know what you're doing). The Tablet and KoalaPad are next in line of performance, with the joystick a poor third. When you're in the heat of creativity, cursor control with a joystick is frustrating at best.

When you boot the FantaVision disk, you get an empty screen surrounded by the various drawing and animation tools you'll need to make your movies. File, the first of the three pull-down menus at the top of the screen, allows you to choose from a list of demo movies. The demo



FantaVision's 'Tweening' technique will make your animation move in a fluid life-like motion. The 'Lean' function makes shadowing virtually automatic.

movies are a good initiation into the powers of the program and should inspire you to turn to the manual and begin experimenting. The trick is not to get discouraged when your first attempts at movie making fall far short of the demos. Persevere—you'll be well rewarded with the results. File

The trick is not to get discouraged when your first attempts at movie making fall far short of the demos. Persevere—you'll be well rewarded.

also gives you several ready-made backgrounds that you can use as "sets" for your movies.

The Drawing Tools

The left side of FantaVision's screen displays icons that represent the program's various drawing tools: a pencil for plotting and joining points, a circle maker, a square/rectangle maker, a hand for grabbing and extending lines, a knife for deleting, a letter icon for writing text, and an interesting feature called a capture box. The capture box enables you to select and change one or several objects from your screen without changing the entire picture.

Moving to the bottom left of the screen, you'll see a choice of four different color palettes, each palette containing 14 different colors. Unfortunately, you must confine yourself to using one palette at a time. If you don't, hardware limitations cause jagged lines to appear between the colors, creating the kind of special effect you definitely want to avoid.

Next is the Go command box, which you activate by pointing and clicking the mouse. Go instructs the computer to begin running frames together, animating your movie. Located beneath Go is a useful feature called Global. Global allows you to make a change and then continue that change throughout the movie, without having to alter every frame individually. Under Global is Overlay, a command that displays all the objects from every frame at once, allowing you to see exactly what paths they will move along during the animation and letting you fine-tune the animations.

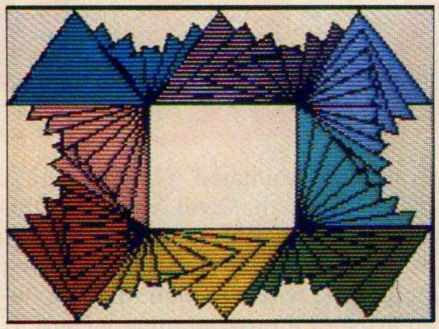
To the right of Go is an object counter. You can create any number of animated objects in your movies, but FantaVision can animate only eight objects at a time. Using the object counter, you can delete objects from any given frame and then add others quickly and easily. This feature is also key to creating foreground and background objects, since the higher the object number is, the further forward the object appears. In other words, object 1 will appear to be behind object 2 if their paths cross in the animation.

Using the Animation Box

By using the "animation box," you can choose among FantaVision's four different modes: the Normal mode is what caused our dancer to jump up and turn into a bird; the Background mode drops an object into the background, letting you create a set or backdrop for your movie. By dropping an object into the background during an animated sequence, you gain the ability to replace it with another animated object at that point in your movie. The Lightning and Trace modes create unusual effects that you have to see to appreciate, but they add to the program's possibilities.

The last feature at the bottom of the screen is a "dimension box," which gives you three different ways of creating objects: using solid shapes, using lines, or using dots.

On the right side of the screen, you'll see the film strip, which has 16 squares, each representing 8 frames. A number at the top of the strip tells you which frame you're working on. Simply by pointing and clicking the mouse on the up or down arrow on



the strip, you can move from frame to frame as you create your movie or jump backward or forward several frames at a time for editing.

Arriving back at the top of the screen, you find two other pull-down menus besides the File menu. The Edit menu gives you a Clipboard to work with off-screen, allowing you to copy and paste an object from one frame to another in your movie. Or you can even copy a favorite object from a demo movie and paste it into your movie. The Cut command takes a whole frame to the Clipboard, and

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CIRCLE 272 ON READER SERVICE CARD

you can then paste that frame in, anywhere in the movie. Clone, Zap, and Undo complete the Edit menu.

Last, but far from least, comes the Goodies menu. Using Goodies, you can manipulate the objects you've created in all kinds of amazing ways. With Zoom, you can make your objects grow until they fill the screen or shrink to near oblivion as a tiny point. Using Turn, you can rotate a circle until all that's visible is the rim. Lean does just what the name says. You can create some exciting effects by using Lean to form shadows for your objects, giving the screen an added dimension. Flip and Squash round out the Goodies section; their names are descriptive enough to allow you to envision their results.

In addition to providing hours of amusement, FantaVision can serve several purposes in a business setting and in the classroom. Imagine, for instance, that you're attending yet another staff meeting, this one on sales projections for the next five years. Just as you've successfully suppressed your third yawn, the VP of marketing flips on a monitor, and six brightly colored bar graphs begin growing and shrinking. Got your attention, didn't it? Sure beats flip charts.

FantaVision is the kind of software I like to call open-ended. The creative possibilities are limited only by the imagination.

As a learning tool in the classroom, FantaVision could be downright inspiring. Picture animated spelling words and multiplication tables, or colorful and animated diagrams, complete with labeled parts.

If you're a lover of hard copy, you should be aware that FantaVision is not set up as a printing program. Obviously, since animation is the software's star feature, your creations would lose their "life" if they were confined to a piece of printout paper. If the graphics you create are so special that you simply must get them on paper, however, you can print out individual screens by saving them as backdrops and then using a screen-dump program.

Imagination Is the Limit

After a week of experimenting with FantaVision, I feel that I've only just scratched the surface of the program's capabilities. FantaVision is the kind of software I like to call open-ended. The creative possibilities are limited only by the imagination. FantaVision users are likely to come up with ways of using the program that even its developers have never dreamed of. ✚

Susan Janus is a free-lance writer living in San Carlos, California. She has written articles for a variety of publications.

PRODUCT INFORMATION

FantaVision
Brøderbund Software, Inc.
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
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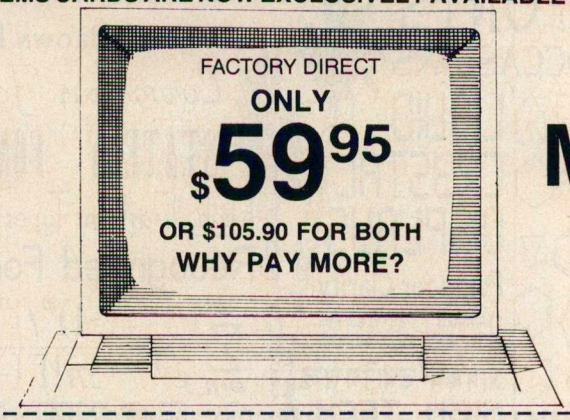

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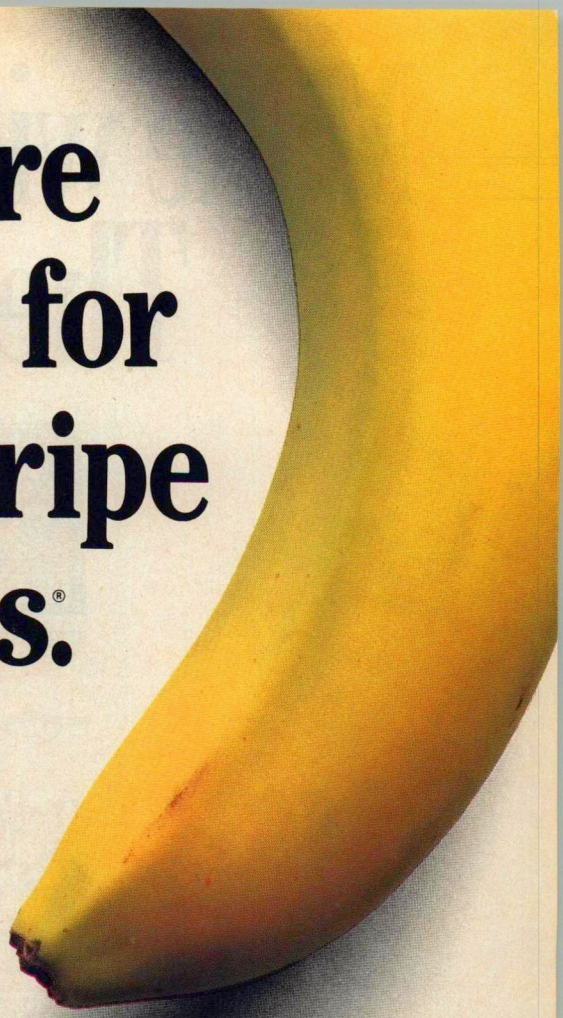

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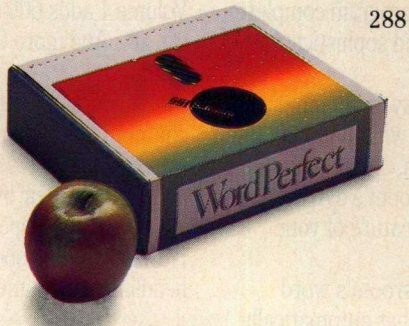

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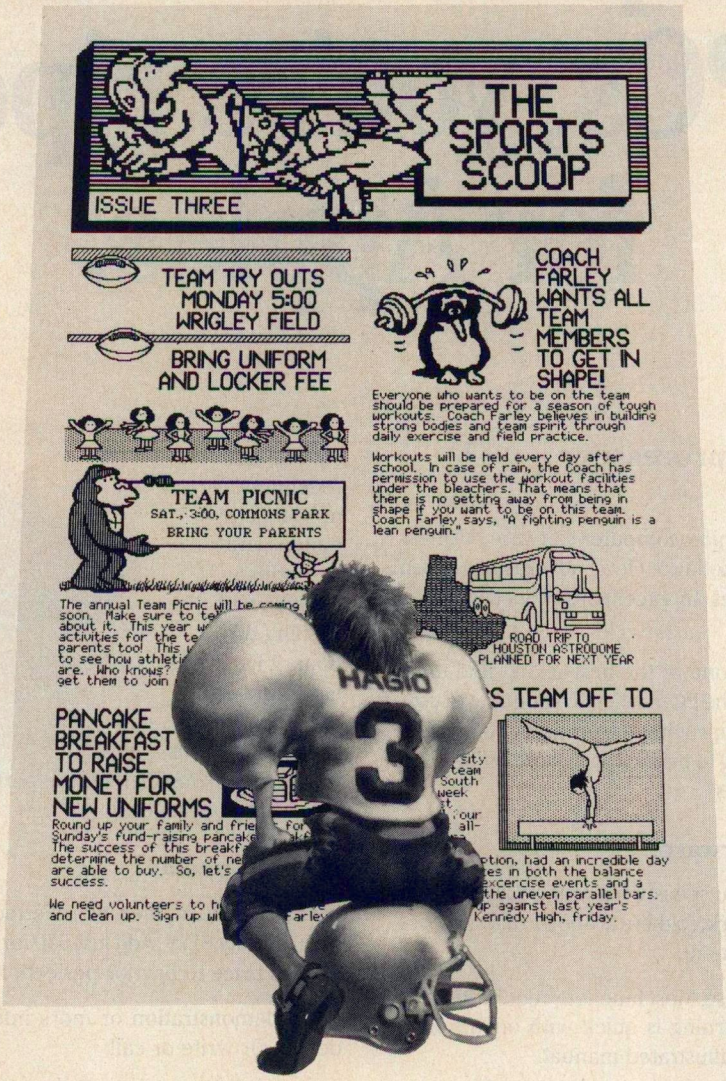

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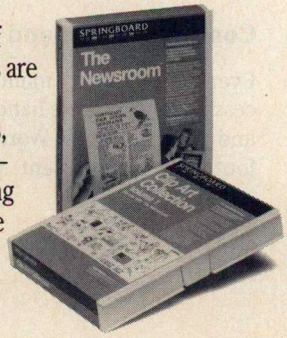

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CIRCLE 261 ON READER SERVICE CARD

BY DAVID D. THORNBURG

WITH FRIENDS LIKE BASIC, WHO NEEDS ENEMIES?

Its violations of accepted programming principles are a disservice to students.

In an upcoming issue of *A+*, you will find an article by me on Logo, in which I make it clear that I am fond of Logo as a programming language. Although some other languages—ALGOL-like languages such as Pascal, descriptive languages including LISP and PROLOG, and some of the newer object-oriented languages such as NEON—are worth knowing, BASIC, especially Applesoft BASIC, is not on my list.

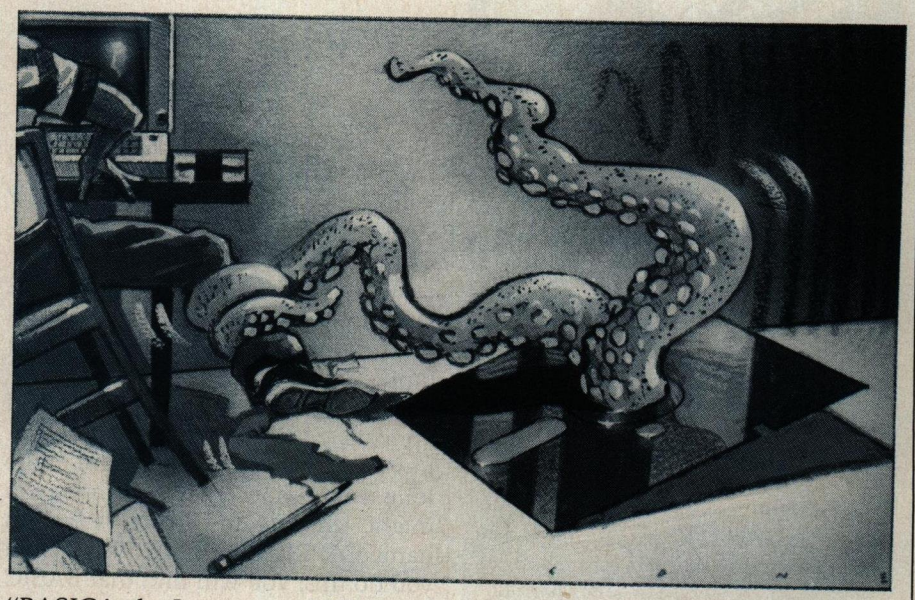
In general, I am in favor of free choice. If you want to write programs in machine language or COBOL, that's fine with me. I don't even care if, as a matter of personal choice, you elect to write programs in Applesoft BASIC. What bothers me is that millions of school-age children are not being given a choice and are being forced to learn a language that violates generally accepted principles of what programming should be about.

Educational systems (such as ours) that persist in the belief that students should learn to program with languages such as Applesoft BASIC are not only wasting student's time, but they are also helping instill an inferior view of what it means to program a computer.

The Experts Speak

I am not alone in my dislike of BASIC. Here are some comments from experts in computer science:

"BASIC is junk food for the mind."
Alfred Bork, University of California



"BASIC is the Laverne and Shirley of computing."
Alan Kay, Apple Fellow

"BASIC is the acne of computer science."
John Allen, world-renowned expert in LISP and artificial-intelligence programming

Little did we know that when we grew up, we could create nonsense of our own using BASIC!

"Let me say flatly that if the choice were between Turbo Pascal and Microsoft BASIC, I would use Turbo Pascal."
John Kemeny, codeveloper of BASIC

Why should a language that is in such common use, both in homes and in classrooms, engender such vitriolic comments? The answer requires an understanding of the function of high-level languages.

A high-level language exists to perform two tasks: First, it must allow its users to create programs that a computer can execute in an unambiguous fashion. Second, it must produce a listing that the programmer and anyone else who may need to read the program can decipher.

How does Applesoft BASIC stack up? Not well, not well at all.

When we were children, many of us read the nonsense poetry of Edward Lear. Little did we know that when we grew up, we could create nonsense of our own using BASIC!

All BASIC programmers are taught that it is OK to enter statements such as

```
A =A +1
```

Although this statement may be acceptable in BASIC, it is pure nonsense to a mathematician. BASIC programmers learn that the reason this structure is acceptable is that the

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equal sign indicates replacement. In other words, this instruction says, in effect, "Replace the present value of A with the present value plus 1." (Are you paying attention? There may be a quiz later on!) Now, what does the equal sign mean in this BASIC line?

```
IF A =6 THEN STOP
```

In this statement the equal sign has a completely different meaning than it did before. It stands for *equal* in the mathematical sense. In other words, this line checks to see if the present value of A is equal to 6. Confused? We're not done yet.

One of the tenets of good programming practice is to use meaningful variable names.

Comparing Apples and Apricots

One of the tenets of good programming practice is to use meaningful variable names. Suppose you are a farmer who wants to create a program to keep track of your apples and apricots. Since Applesoft BASIC allows variable names that are quite long (more than 200 characters), you might choose to create variables named APRICOT and APPLE. When you do this, you will find that BASIC graciously accepts your names and repeats them faithfully whenever you list your program. The catch is that Applesoft pays attention only to the first two letters of a variable's name, making both of these variables the same internally.

Try this program on for size:

```
10 APRICOTS = 23000
20 APPLES = 12000
30 PRINT APRICOTS
```

When you run this program, the number 12000 will print, rather than the 23000 you were expecting.

To add insult to injury, an Applesoft BASIC programmer cannot embed any BASIC keywords in a variable name. Thus, you can't have variables named FOREIGN, DIFFERENCE, STATUS, or any other word that contains a BASIC keyword anywhere in its name.

"All right," you're saying, "this is a problem, but it is easy to get around it by teaching people to use variable names with only one or two letters."

I wish it were that easy. For example, try this little gem on your II:

```
10 A = 10
20 B = 10
30 IF B =A THEN PRINT "HELLO "
40 END
```

Now run the program and see what happens. Not a pretty sight, is it? For the benefit of those of you for whom BASIC is only a bad memory, this program doesn't work because the Applesoft parser scans from left to right and doesn't pay any attention to spaces. When it gets to line 30, this is what the parser "thinks" you mean:

```
30 IF B = AT HEN PRINT "HELLO "
```

What a friend we have in BASIC!

Up Variablescope!

Have you ever written a BASIC program like this one?

```
10000 for I =1 to 1000
100 10 GOSUB 20000
10020 NEXT I
.
.
.
```

(several pages later)

```
.
20000 REM SUBROUTINE
200 10 for I =1 to 50
20020 (statements of your choice)
20030 NEXT I
20040 RETURN
```

What happens? Total chaos! By the time you wrote the routine at line 20000, you forgot that variable I was in use. By using it again, you interfered with a loop several pages away. You can avoid this type of program by being extremely careful in your choice of variable names, but you shouldn't have to worry about such nonsense.

Because Applesoft's variables are global in scope, they are accessible to all parts of the program—whether you want them to be or not. Languages that include local variables (such as Logo and Pascal) avoid this problem, as well as the other problems mentioned above.

I could go on forever, but you see my point. From my perspective, it is one thing for a hobbyist to choose to use BASIC and another for our schools to use our tax dollars to perpetuate what amounts to a sick joke on our students.

As BASIC's coinventor suggests, you might want to try Turbo Pascal instead. As for me, I think I'll stick with Logo. +

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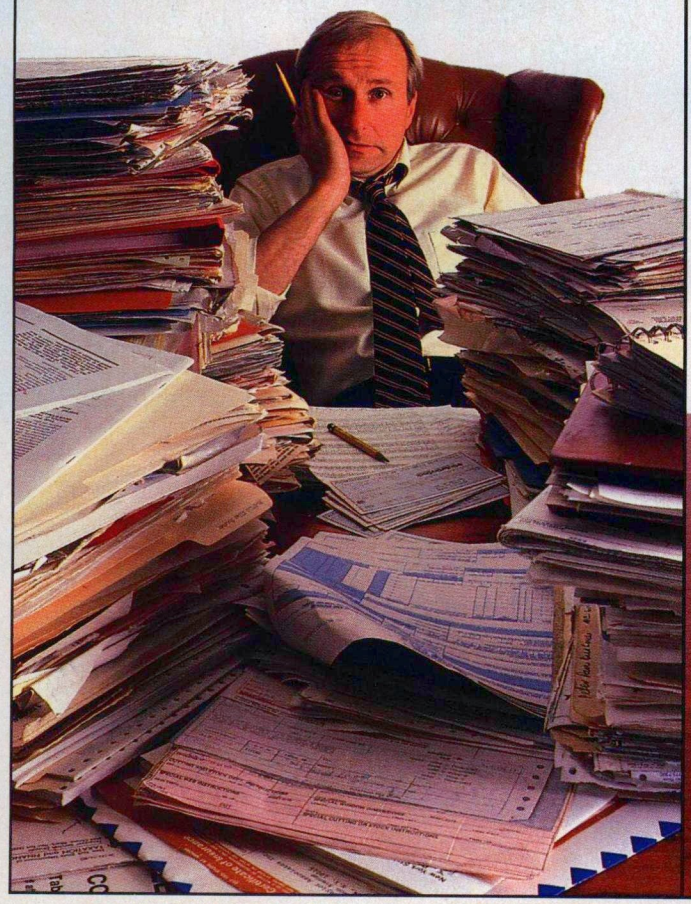

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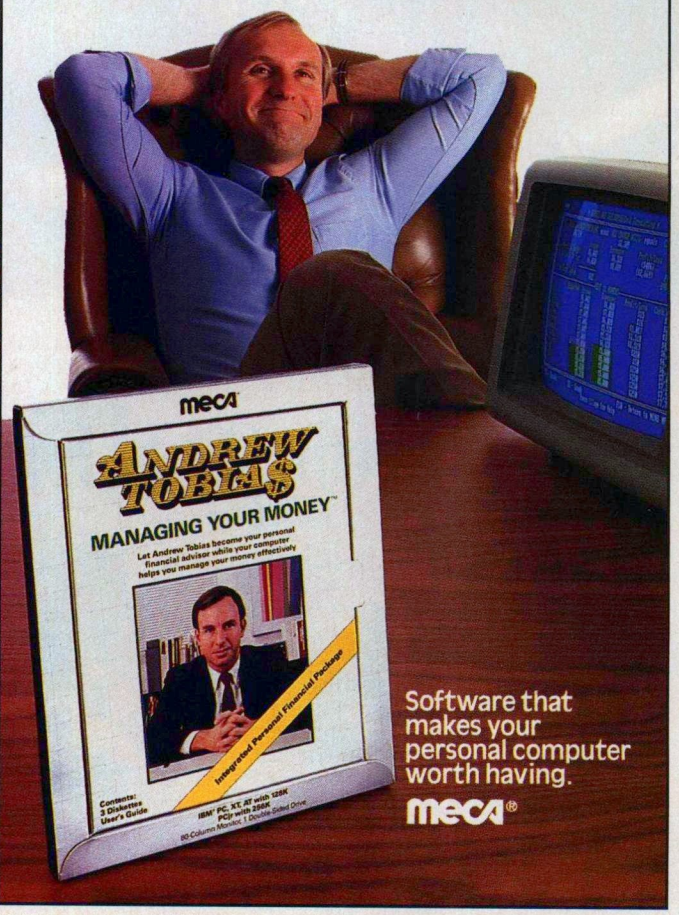

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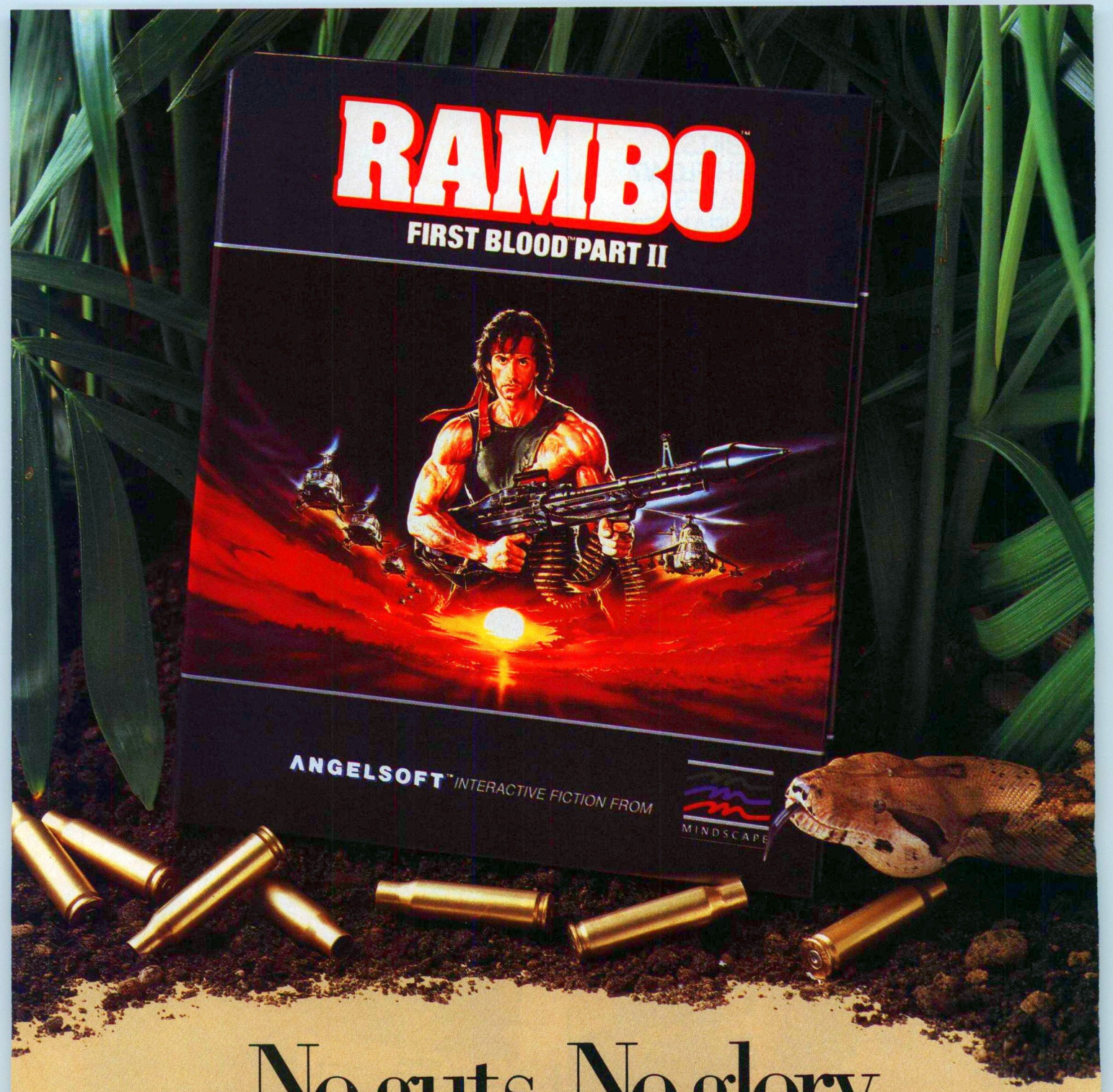

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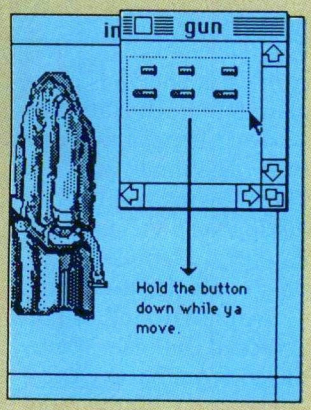


You start the game in a stall with a trench coat, a gun, a nasty bump on your head, and an even nastier set of needle marks on your arm.

Editors' Note—Two Macintosh games from two different companies have appeared on the market at the same time, both with the name Deja Vu. To help sort out the confusion, we are running our reviews of these two products side by side.

PLAY IT AGAIN, SAM

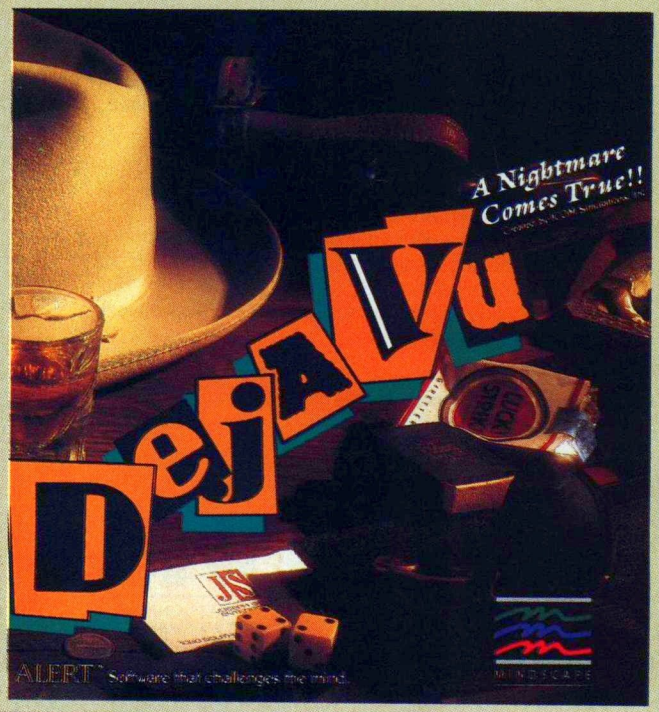
"Well, sweetheart, there I am, see, sitting on the throne with a hangover the size of the East Side. Only I ain't got a hangover, see, 'cuz someone played the tom-toms on my head. I'm feeling dizzy, see, and I try to get up. Then I notice little marks on my arms—needle tracks, you know, like when the doc gives you shots. And I don't know who stabbed me with the needle. And I don't know what bum rolled me.

"Then I get to thinkin', and I feel kinda funny, see, like, like, when you first kissed a dame, or, or, after you slugged the school bully right in the mug. And I'm thinkin' and I'm thinkin' and I'm rifling this trench coat and I'm looking at this .38 and you know what? I can't remember my name. I stagger to the sink, look in the mirror, and I can't remember my face. Listen, babe, ain't nuthin' worse in the world than not knowing who you are."

Deja Vu, a graphics adventure game for the Macintosh from Mindscape, places you in the shoes and trench coat of . . . Gee, I can't tell you that. Figuring out just who you are is a major part of the game. Suffice it to say that you start the game in a stall with a trench coat, a gun, a nasty bump on the back of your head, and an even nastier set of needle marks on your arm.

It doesn't take an ace gumshoe to figure out that you've got to find out what courses through your veins. As you wander around, you find someone—a corpse. It seems somebody plugged this guy with three slugs. A quick look into your gun reveals three bullets and three spent cartridges. Nice touch, huh? They always said frames were for pictures and suckers. To make matters worse, the cops, the mob, and some other people are all looking for you.

The real innovation of the game comes when you interact with the computer. Four main windows appear on the screen. One shows a graphic image of what you see, another displays your inventory, the third shows you all possible exits from a room or area, and the fourth displays the text descriptions. You almost never type anything to move around and use objects. Instead,



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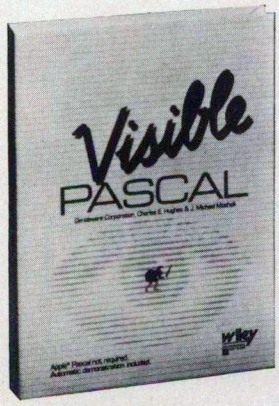

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CIRCLE 114 ON READER SERVICE CARD

THAT'S entertainment

you control the whole adventure by pointing to one of nine words—*examine, open, close, speak, operate, go, hit, consume,* and *self*—and clicking on an object appearing in the view and inventory windows.

The effect is fantastic! Who needs a parser structure when all you have to do is point and click? Want to start the car with the key? Point and click on the word *operate*, the key, and the ignition. Bang, there you go. Want to pick up an object? Just point to it, press and hold the mouse button, and then drag the object into your inventory window. The process is fast and neat and certainly helps you get involved in the game.

You are going to need some time and quick thinking to solve the mystery. Deja Vu can be lethal, but boy do you learn what works and what doesn't. The game moves along, and you always feel that you are accomplishing something. As with other adventure games, though, certain actions that seem logical aren't permitted. For example, although you can frisk the corpse in the bar, you can't frisk it in the office.

My big objection is the price, a wallet-splitting $54.95. That hurts worse than the bump on your head. Yes, ICOM Simulations, which created the game for Mindscape, has presented a radically new and efficient way to play an adventure game. Yes, Deja Vu involves you and makes you want to go back and play it even after you've died for the 43rd time. Yes, I'm sure many man-years of work went into programming the

game. But $54.95 is just plain too much. Take my advice, Mindscape: Cut the price in half, and Macintosh owners will be buying Deja Vu faster than parents bought Cabbage Patch dolls for their kids.

"And that, doll, is how I cracked the case. Yeah, the cops are happy, and I'm square with the mob. The only people who ain't pleased with me are the hacks. You know, the cabbies I stiffed for the fare. Oh, yeah, the butler too. Look babe, I had to hit him first, see, before he threw me outa the house.

"So whadya say we blow this joint, pick up a bottle of vino, head back to my apartment, and, uh, look over the files. No, I'm not givin' you a line. Us heros are like that, tough on the outside, soft on the inside. Sure, I mean it. I know how to treat a lady. Hey, be with ya in a minute. I wanna fix my tie.

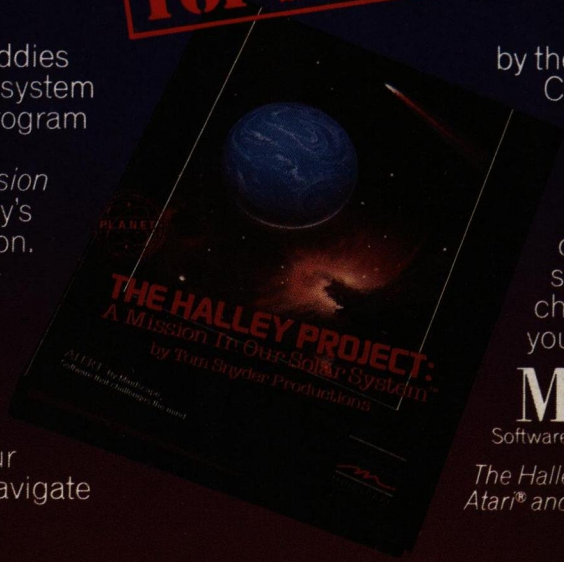
"Yeah, never looked better. Yeah, good to know who I am. Yeah, here's lookin' at you, kid."

Russ Lockwood

Deja Vu
Mindscape
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667
List Price: $54.95
Requires: Macintosh
CIRCLE READER SERVICE NO. **402**

Just tell your friends you're going on a very long trip.

TOP SECRET



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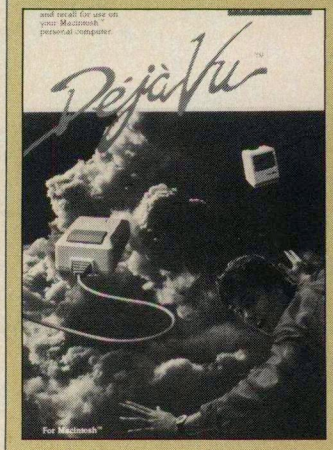
CIRCLE 176 ON READER SERVICE CARD

THAT'S entertainment

MEMORY TEST

The getaway car screams around the corner as the alarm clangs and the bank guard shouts, "Halt!" Quick—what was the license number? Do you draw a blank in crises like



that? Does your brain simply flash "not enough memory?" Perhaps it's time for Déjà Vu, a mind-sharpener that runs on the Macintosh.

This educational game stresses pattern recognition, memorization, and reaction time more than it does reasoning power. The playing board is a grid of 30 squares. As you point and click on each square with the mouse, an image appears briefly and then disappears. You get two squares for each turn, and the goal is to match two of the same images on the board. When you make a match, the two squares blink and beep, they are erased from the board, and you score one point.

You can choose among five sets of images, each of which tests different kinds of memorization. The Pictures set features the cheery images of Apple's Cairo font, such as a dog, a frog, or a flower. The Shapes set contains sharp two-dimensional and three-dimensional geometric forms. The other sets are Letters, Numbers, and Words. Each time you play, the order of the set distributed behind the squares is rearranged.

Déjà Vu's menus allow you to use a timer clock, control the length of time the image appears on the board, and vary the sound. In the two-player game, you are invited to enter your names, which then appear in two plaques on the board. Each illuminates as you take turns trading the mouse back and forth, keeping score as you go. You can choose just to practice, or you can pit your wits against the Mac. The Mac has three levels of power, and you'll need the memory of a herd

of elephants to beat it!

Because Déjà Vu is completely mouse-driven and accessible at so many levels, almost anyone can use it, although the grid has too many squares for most preschoolers to be able to cope with it comfortably. Many handicapped and special students may find it valuable not only as a game, but also as challenging therapy.

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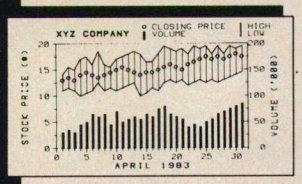
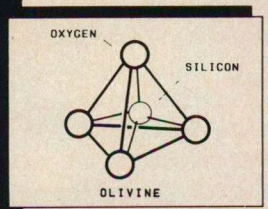


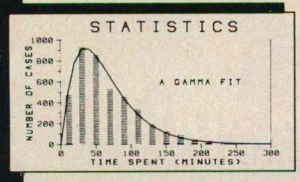
"The Prime Plotter is the kind of graphics package you'd expect to find on a mainframe computer." "Once mastered, there is no plotting package that is quite this versatile and powerful."

Gregory MacNicol
InfoWorld September 5, 1983



"The Prime Plotter contains more power than any graphing package I have used." "It can do many things not found in other packages; I know of no competing program which can do as much!"

David Morganstein
Washington Apple Pi May 1983



"The Prime Plotter is a surprisingly complete plotting package designed for a variety of applications. Routines to create X-Y plots, 3-D charts, bar graphs, and figure charts make the product the most powerful plotting package the reviewer has seen." "The product is superb for creating 'slide-show' presentations of generic data."

Chris Williams
MICRO August 1983

The Prime Plotter	$240
Demo disk, refundable	$15
Manual, 2nd edition, enhanced, for 1st-edition users only	$15

Plotter Interfaces:

STROBE 100/200	$60
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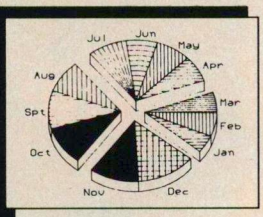
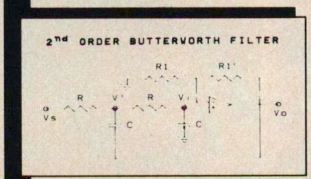


"Prime Plotter is a carefully conceived, well-executed package for business or scientific applications that can benefit from its great power." "Flexibility is the hallmark of this package."

AEDC
SOFTALK September 1983



"At first glance, it's almost overwhelming." "While simplicity is a key, the myriad of possibilities featured can test the ingenuity of even the most knowledgeable user."

Business Software
Vol. 1, No. 5, Sept./Oct. 1983

PEELINGS II Rating

The Prime Plotter	A+
Apple II Business Graphics	A–
PFS Graph	B
Versaplot	D

"In conclusion, if you are looking for the most powerful program for scientific or business use and are willing to spend several days learning the system, The Prime Plotter is your best choice."

Plotter Summary
PEELINGS II Vol.4, No.4, 1983

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CIRCLE 239 ON READER SERVICE CARD

I uncovered a hidden bonus in Rubicon Publishing's Déjà Vu. You can extract the four vocabularies of images that appear in the windows as fonts by using Font Mover on another disk containing MacPaint and/or MacWrite. Déjà Vu Shapes font in MacPaint at 36-point size provides instant keyboard images that you can use as icons, symbols, and patterns.

Anthony Reveaux

Déjà Vu
Rubicon Publishing
La Costa Centre
6300 La Calma Drive
Suite 100
Austin, TX 78752
(512) 454-5004
List Price: $39.95
Requires: Macintosh
CIRCLE READER SERVICE NO. **403**

NUMERICAL OVERKILL

I suppose it was inevitable. People have written computer programs to cast their horoscopes, compute their biorhythms, divine the *I Ching*, and perform their tarot readings. It was just a matter of time until someone wrote a program to do numerology. Well, computers are supposed to be good at numbers. The program is Numerology for the New Era, Your Guide to Life, and it was written by a 62-year-old former nurse who says, "Numbers bring people together."

I, however, remain skeptical.

The number 1040, for instance, does absolutely nothing for me.

According to the text on the package, Numerology was founded by Pythagoras around 600 B.C. Numerology is supposedly a mirror that reflects your life's journey in numbers, and the numerical significance of your name and date of birth "form a unique blueprint of the talents, abilities, and challenges that ask to be expressed. . . ."

The program begins by asking you for your name, date of birth, and today's date. It then reports your destiny, soul desire, personality, purpose, life goal, and personal year, each as a single-digit number, except for the life goal, which is a fraction. In my case, my destiny is 7, my soul desire is 0, my personality is 4 (I always thought I was a 9), my purpose is 4, my life goal is 11/2, and my personal year is 3. I've no idea what any of this means.

The next screen is labeled Dates and Challenges. It says that my dates are 1, 6, and 9, and my challenges are 5 and 3;

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CIRCLE 234 ON READER SERVICE CARD

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my 3rd is a 2, and my 4th is an 8. I still don't know what this means. The screen after that is Pinnacles. According to this one, my 3rd is now a 4—even though the previous screen said it was a 2.

The next screen is Soul Lessons. The program, sensing perhaps that I am a confirmed skeptic, gives me all minuses, indicating I need more soul lessons. (Or is that fewer soul lessons? I'm not sure.)

After the sixth screen of this, I am starting to feel like a man trapped in a fortune-cookie factory.

Having determined my numbers, the program is ready to print out my chart, either to the screen or the printer. First is the Destiny Number, which is supposed to represent my mental aspect. I am a 7, and this particular vibration "urges you to seek out all the wisdom and knowledge of the universe for the purpose of teaching it to others. You have an inner magnetism which will attract others to you. . . "

Next up is my Soul Desire, which, according to this program, is "self-expression." Allegedly, I desire to express my creative talent in acting, writing, speaking, or art. (My publishers will probably be relieved to hear this.)

The program also says that my Personality appears to others as "disciplined, practical and stable; one who thrives on hard work." Furthermore, I have square shoulders.

My Life Goal is a subtle influence that comes to the surface in the middle half of life. I am promised great activity in the second half of my life. The accent is on travel. Furthermore, I could shine as a writer or find success in the field of communication in a way to benefit mankind.

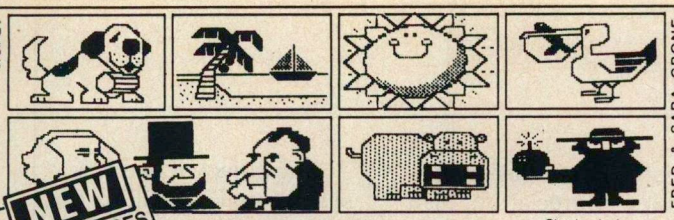
Indeed, the keynote of my Personal Year is to learn to express my talents in speaking, writing, or the arts. There is a new energy force operating in my life now.

Etcetera . . .

Unfortunately, the program goes on and on and on. There's some stuff about my birthdate numbers and my yearly cycles and particular challenges, and after the sixth or seventh screen of this, I am starting to feel like a man trapped inside a fortune-cookie factory. It's all very vague and general. These descriptions could be true about anybody. I once worked as a fortune-teller in a carnival. I wrapped a towel around my head, put on a false beard, looked deep into people's eyes, and told them they had a sensitive soul. The marks ate it up. It didn't make much difference in the quality of their lives, but they loved the illusion of *insight*.

I suppose, if you are a student of Numerology, this program might be useful to you. If, like me, you know absolutely nothing about Numerology, this program is unlikely to unmuddy the waters. It includes no ex-

AD #242



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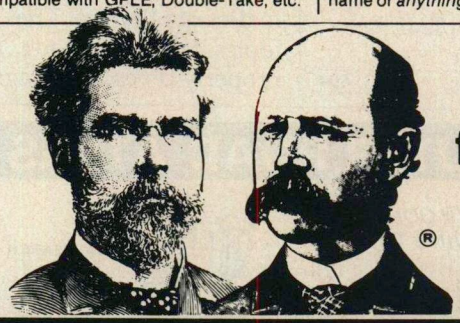

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planation of the theory behind the program and very little explanation of what all these various numbers are supposed to mean.

Allegedly, you can recoup your $49.95 investment by printing out charts as gifts. Frankly, this skeptic doubts it. For my part, I think Pythagoras should have stuck to triangles. At least triangles have an obvious point.

David Gerrold

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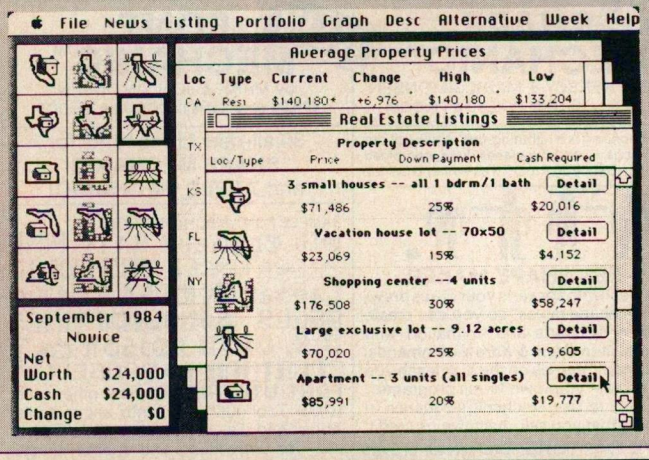
If your heroes have names such as Trump, Hilton, or Marriott, keep reading. Baron, from Blue Chip Software, is a real-estate simulation game that will keep you watching mortgage rates and almost have you on the phone to your banker.

To begin playing the game, novices and landlords alike should start by reading Baron's primer, *An Introduction to Real Estate Investment*. Through this well-written guide, players learn not only fundamentals of real-estate investment and speculation, but also the basics of real-estate finance. The topics it covers include property types, mortgage instruments, brokerage, taxes, depreciation, cash flow, leverage or borrowing, and options. I'm not suggesting that once you have read Baron's primer, you'll be ready to "bet the farm," but you'll have a better understanding of the dynamics of the simulation and thus the market itself.

The object of Baron is simple: make a million dollars as fast as you can. Baron rewards fast-trackers and punishes those who take a longer view of life. In Baron, you have 60 months to make it. If you're not a millionaire at the end of five years, then you might as well pack up and go back to River City



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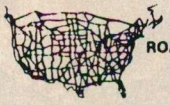
ROADSEARCH MAP

```
FROM----------ATLANTA GA
TO----------CHICAGO IL
TOTAL DISTANCE-718 MILES
TOTAL TIME-----13:48 HRS:MIN
AVERAGE SPEED--52 MPH
VEHICLE MPG----20 MPG
TOTAL GALLONS--36 GAL.

                        !  ELAPSED
                 TIME ! MI.  TIME
                 ---- !---- -----
I 75 (113MI)TO-      !
  CHATTANOOGA TN 2:10 !113  2:10
*************************!***********
I 24 (127MI)TO-      !
  NASHVILLE TN   2:26 !240  4:36
*************************!***********
I 65 (451MI)TO-      !
  GARY IN        8:40 !691  13:17
*************************!***********
I 90 (27MI)TO-       !
  CHICAGO IL     0:31 !718  13:48
```

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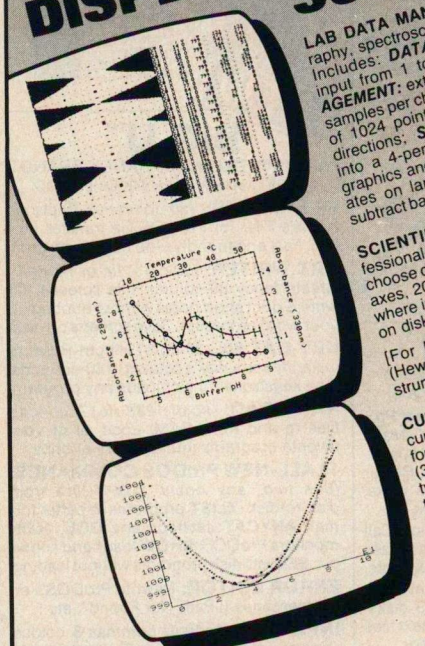

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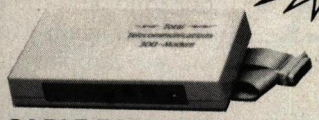

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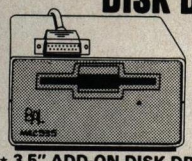

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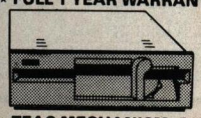

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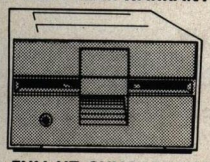

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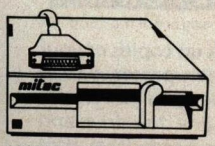

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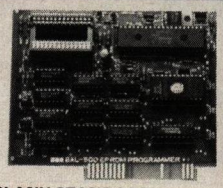

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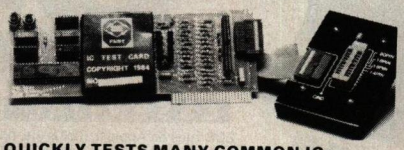

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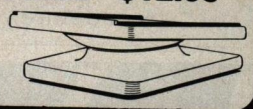

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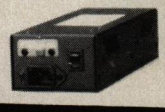

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CIRCLE 167 ON READER SERVICE CARD

and work in a drugstore.

On the other hand, you start out with $35,000 in cash and the near-respect of your simulated peers. If you're able to increase your net worth (your net worth is the difference between your assets and liabilities) to $50,000, you're rewarded with the title of investor and can thus take out 90% loan-to-value mortgages, instead of being stuck with your original novice credit rating of only 80%. (You calculate loan to value by dividing the principal amount of the loan by the appraised value of the property.)

With an $80,000 net worth, you are considered a speculator and are able to sell options on property as well as exercise them (a right you had since you were a novice).

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4%. After that, making money is no problem.

Baron befriends fallen capitalists, recognizing that even the most talented investor can fall on bad times. The game allows you to retain your title and privileges, even if your net worth falls below the minimum.

Every simulation begins on January 1, 1984. The mortgage rates and property prices change each month, along with the economic news. Each simulation is different, so you can't win by employing the same strategy twice. When the game advances to December of 1988, Baron converts all holdings to cash, in essence liquidating your portfolio, and then lets you start again. Up to 14 players can play Baron at one time.

You Against the World

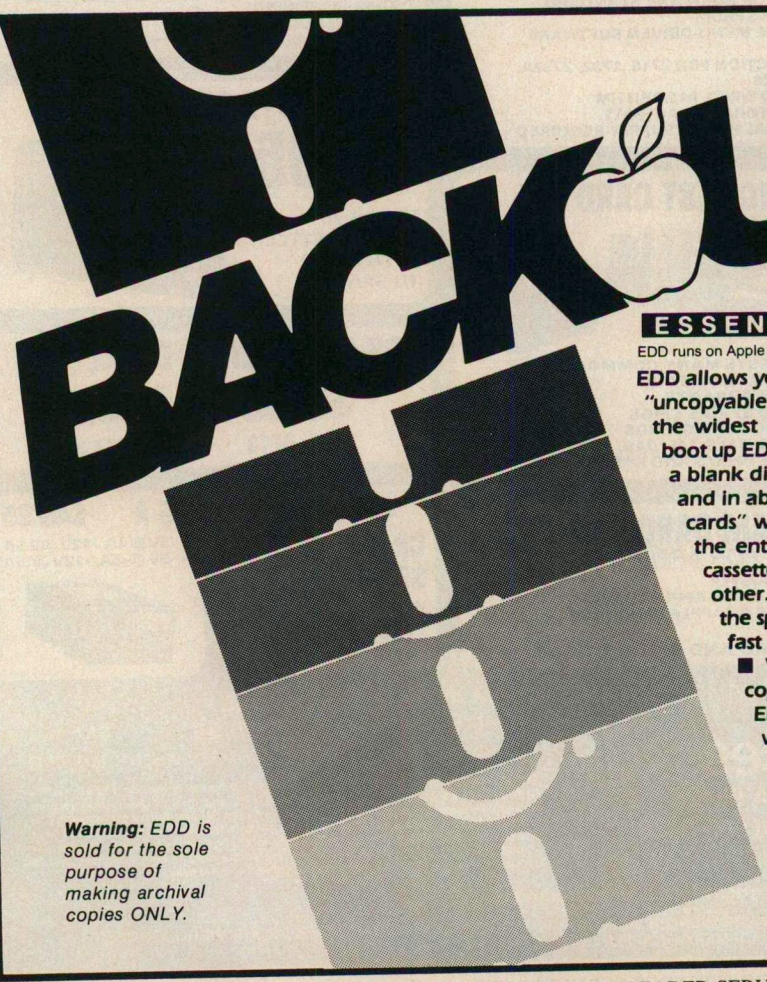
Once you get started, you constantly consider investments in California (beware of earthquakes), Texas, Kansas, Florida, and New York. In each month, you have access to a host of real-estate and economic statistics to help you make your decisions. The challenge is the market—you against the world!

Not for the Casual

If the last sentence sounds corny to you, don't buy Baron. I found it a lot of fun, but it is designed for fanatics, not casual players. If you like the "bookshelf" strategy games of yesteryear and real estate is your passion, Baron is for you.

Ken Landis

Baron
Blue Chip Software
6744 Eton Avenue
Canoga Park, CA 91303
(818) 346-0730
List Price: $49.95
Requires: Macintosh
CIRCLE READER SERVICE NO. **405**



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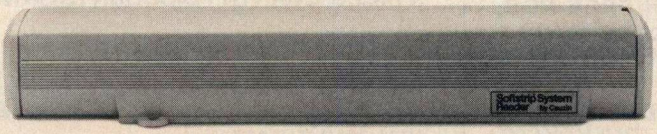
CIRCLE 340 ON READER SERVICE CARD

It's amazing what you can reveal when you strip.

Introducing a shape that's about to turn on an entire industry.

The Softstrip™ data strip. From Cauzin.

This new technology allows text, graphics, and data to be encoded on a strip of paper, then easily entered into your computer using a scanning device called the Cauzin Softstrip™ System Reader.



The Cauzin Softstrip System Reader replaces tedious typing by scanning the strip and reading it into your computer.

Creating a simple, reliable and cost efficient way to distribute and retrieve information.

Softstrip data strips, like those you see here, can contain anything that can be put on magnetic disks.

Facts. Figures. Software programs.

Video games. Product demonstrations. Sheet music.

The Cauzin Softstrip System Reader is now compatible with the IBM PC, Apple II and Macintosh.

A single strip can hold up to 5500 bytes of encoded data.

It can stand up to wrinkles, scratches, ink marks, even coffee stains.

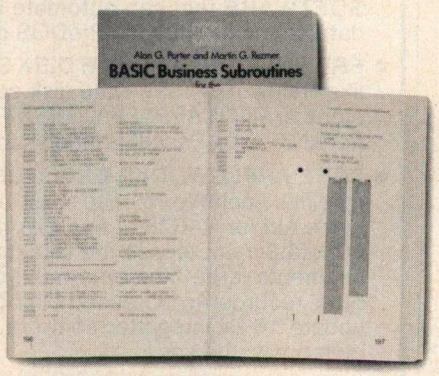
And it can be entered into your computer with a higher degree of reliability than most magnetic media.

Simply by plugging the Cauzin Reader into your serial or cassette port and placing it over the strip.

The reader scans the strip, converts it to computer code, and feeds it into any standard communication interface.

Because strips are so easy to generate, most of your favorite magazines and books will soon be using them in addition to long lists of program code.

And you'll be able to enter programs without typing a single line.



Soon everyone will be stripping as data strips appear in popular magazines, computer books and text books.

There is also software for you to generate your own strips. Letting you send everything from correspondence to business information using our new technology.

Find out how much you can reveal by stripping. Just take this ad to your computer dealer for a demonstration of the Cauzin Softstrip System Reader.

Or for more information and the name of the dealer nearest you, call Cauzin at 1-800-533-7323. In Connecticut, call 753-0150.

Softstrip™
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Cauzin Systems, Inc.
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CIRCLE 120 ON READER SERVICE CARD

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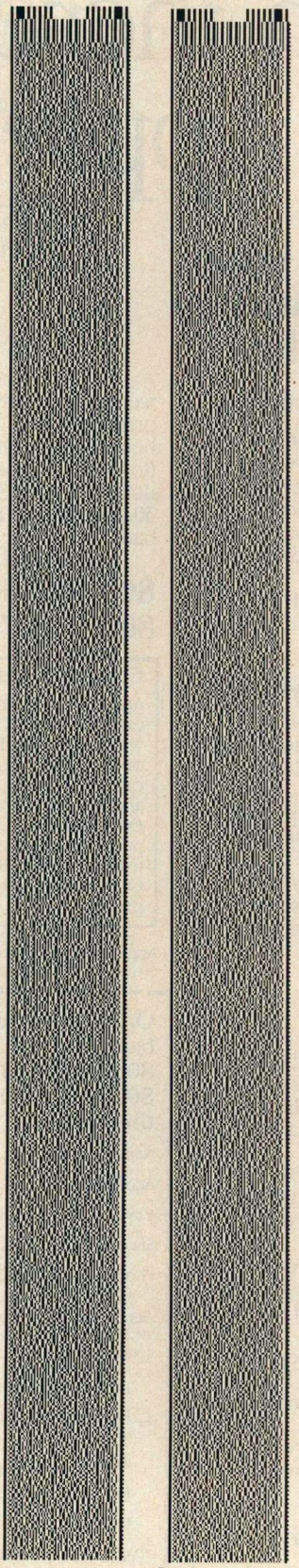


1a 1b 1c

Softstrip

CASH BUDGET

Here are two programs you can run by stripping. Just take this ad to your dealer for a demonstration.

CASH BUDGET
CASH BUDGETING
The three strip program (1a, 1b, 1c) contains a 350 line, Apple BASIC, financial program. It helps you plan cash and budgets. The program comes from John Wiley & Sons' book "Essential Programs for Small Business Planning," by Michael Kilpatrick. You can find more programs and complete documentation for this one in the Stripware™ product of the same name, or in the J. Wiley book. To use them, just enter them and run.

CAUZIN DEMO
SOFTWARE ON PAPER
The single strip (2) contains an entire BASIC software program demonstrating how text, graphics and even sound will come to you on data strips.
Read it into any Apple II series computer and run it.

2

Softstrip

CAUZIN DEMO

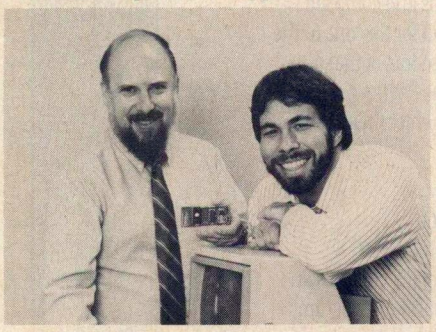
"SwyftCard™ is an incredible addition to my Apple® IIe."

Steve Wozniak,
Apple IIe user

This new $89.95 plug-in card gives you an amazingly easy, blindingly fast way to write, file, communicate and calculate.

You've never seen an Apple IIe do word processing, filing, communicating and calculating the way it does with a SwyftCard.

Steve Wozniak calls it revolutionary, adding "If I had thought of the SwyftCard while creating the Apple II, I would have built it in." Fomenting revolutions comes naturally to SwyftCard inventor Jef Raskin, whose previous efforts to make computers simple and useful include creating the Macintosh™ project at Apple.



SwyftCard creator Jef Raskin and Apple II creator Steve Wozniak

SwyftCard transforms the Apple IIe into the computer it ought to be.

The SwyftCard creates a 40K-byte working space, or "universe," capable of holding about 20 pages of single-spaced text. The universe accepts whatever you put in — text, numbers and data, in any form you choose, without you having to switch programs or modes.

Throughout your workday, you can enter information into the universe in free form: a report, names and addresses, daily to-do list, new telephone numbers, client list — anything you're working on.

A universe resides in memory while you are using it, and when you are done you save it to a disk. An unlimited number of universes can be created, each kept on a separate disk.

The secret to working in a SwyftCard universe is the patent-pending cursor. It works faster than control keys or a mouse, and doesn't make you take your hands off the keyboard.

SwyftCard is a better solution to your day in, day out word processing and data management needs. It is faster, easier and more useful.

How much faster is SwyftCard?

From a power-off start, SwyftCard loads a universe and displays exactly where you were last working in just six seconds, automatically, with no commands.

SwyftCard finds and displays any piece of information in your universe in less than 300 milliseconds.

SwyftCard saves an entire universe to a disk in just eight seconds, including automatic formatting if necessary.

How much easier is SwyftCard?

For all it does, SwyftCard uses only seven commands. And each is available immediately by pressing a single key once.

To start using SwyftCard, simply plug the card into Slot 3 (which most other cards can't use), turn the Apple IIe power on, wait six seconds and begin typing.

To use an Apple program, just load it in; SwyftCard turns itself off and won't interfere.

How much more does SwyftCard do?

SwyftCard communicates with data services without you having to learn their editors, and lets you directly edit information you bring in without special commands or file transfers.

SwyftCard is great with numbers, performing calculations — including scientific work — anywhere in your universe.

Using the SwyftCard-ProDos utility disk, which is included, you can transfer information developed in SwyftCard to other programs, and vice versa.

SwyftCard is not a spreadsheet, nor will it do everything for everybody. But no other system delivers the common sense utility of SwyftCard.

Of course, SwyftCard comes with a complete manual and an on-screen tutorial.

Try SwyftCard for 30 days.

Everyone we've shown this ad to has said SwyftCard sounds too good to be true. Maybe you feel that way too. But everyone we've then shown the SwyftCard to says it's better than the ad claims. So we want you to try it at our risk.

If we sent you product literature or tried to answer your questions by phone, we would just repeat this ad. The only practical way to find out if SwyftCard will help you is to accept the 30-day, no questions asked, money-back trial offer. If you don't like your SwyftCard, return it within 30 days and we'll send you your money back.

To order, call us at:

800-982-5600 in the U.S.
800-562-7400 in Calif.

Computer system requirements

Apple IIe, regular or extended 80-column card, 80-column monitor, one disk drive with controller. For communications: 300 or 1200 baud modems and Super Serial card. To transfer data between SwyftCard and Apple programs with ProDos utility: extended 80-column card or two drives. To print: any Apple, Brother, C.Itoh, Centronics, Epson, HP, NEC, Okidata, Panasonic, Qume, Star, Toshiba and most other printers.

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Information Appliance Inc.

CIRCLE 165 ON READER SERVICE CARD

BY MICHAEL WIESENBERG

AN EVEN BET: WAGERING WITH MARBLES

The odds of choosing one of two black marbles from a bag of white

WILLIE KEATS

All good projects come to an end sometime, and even the workaholics of I-Q Industries in the heart of Silicon Valley get a little R&R as a reward for their R&D efforts. Spotswood Gilbert, senior programmer, has just risen from his seat at a table by a huge plate-glass window that frames a panoramic view of the Valley, sweeping all the way from the hills of east San Jose on the right to San Francisco's TransAmerica Pyramid on the left. Others on the team that developed and documented the FORTRAN 77 compiler for I-Q's new reduced-instruction-set computer are just joining Gilbert at the table in this restaurant on Skyline Boulevard in the northern extension of the Santa Cruz Mountains.

Hotshot young programmer Bob Levin looks like he would be more comfortable in his usual jeans and T-shirt than the slacks and baby-blue dress shirt he has on. He almost knocks over his stunning blonde companion as he tries to pull out a chair for her.

"This is Stephanie. She works at Apple. Stephanie, that's Spotswood Gilbert. He did the front end for our new compiler—and his wife, Martha. That's Marion Smith, our system operator, and uh . . ."

Charms on her bracelet jangling, Smith pauses in the act of trying to get life from an unresponsive disposable lighter. "Willy Chin. Willy's an engineering supervisor at Lockheed." Willy, who has a graying engineer's beard—full beard and no mustache, that is—lights Smith's cigarette with a large silver Zippo, smiles at Levin, and winks at the cute blonde.

Levin continues the introductions. "Sally McRae and Barton Dumbridge. Sally did a lot of the back end for the compiler. Bart's in support for technical languages. Grey Scrivener; he wrote the manual. And . . .?"

'Figuring the chances is just a matter of applying permutations and combinations.'

Scrivener is impeccable in a charcoal three-piece suit, Nicola Mancini white shirt, narrow tie, and Italian slip-ons. "This is my friend Charles LaFebvre. He services Apples for Compu-R-X."

LaFebvre has pewter pants that match his hair, a mauve silk harem shirt with three buttons undone, and two diamond stud earrings in his left ear. "Hi there. Sure is nice of your company to bring us to this fabulous restaurant."

Best Steak in the Valley

Now that everyone else is seated, Gilbert squeezes his six-five frame into the Balans chair. "Order yourself a drink, Charles. I-Q's paying for everything. And you'll be able to order the best steak in the Valley in about half an hour."

Smith looks in wonderment at McRae. "This is the first time I've seen you in a dress, Sally."

"I bought it this afternoon. I don't own any others. Well, Stephanie, are you a programmer, too?"

"No, I'm in public relations. I tell the press about Apple's new products and answer embarrassing questions from reporters about the company's internal affairs."

A waitress appears. LaFebvre re-

quests a champagne cocktail. "Oh, like when will the Mac have a color monitor?"

"The answer to that one is we feel that the high-resolution screen and its friendly interface are more important than displaying on screen what today's printers are not capable of putting on paper."

Scrivener asks the waitress if they have Watney's and is pleased to be told yes. "And what do the employees feel about Apple's suing one of its founders?"

"That's easy. The answer is 'no comment.' And then I change the subject. By the way, aren't you the group that likes to solve puzzles with your computers? I have one for you. I know someone who likes to make bets with his friends, but he doesn't want to take advantage of them, so he bets only when he has neither the best nor the worst of it.

"He has one proposition that, for even money, works out to exactly 50–50. He has a bag full of marbles, two of which are black and the rest white. There are two numbers, call them x and y, both of which are less than 100 and greater than 1. He tells the person with whom he is betting the total number of marbles, y. He asks the person to reach into the bag, without looking in, and remove x marbles, and he bets that at least one of those marbles will be black. What are x and y?

That's the specific case, and it has precisely one solution. He would like to be able to put other amounts of black marbles into the bag (perhaps one, three, or four); can he then devise other similar propositions that work out to exactly the same 50–50 situation? That's the general case."

'Working backwards from the chances probably requires a computer program. Certainly coming up with the general case does.'

The waitress deposits a light beer in front of Dumbridge. "Betting that the person grabbing the handful of marbles will end up with at least one black marble is the same as betting that all the marbles he pulls out will be white."

Figuring the Chances

Levin sips his newly arrived Tequila Sunrise. "Right, and figuring the chances is just a matter of applying permutations and combinations."

McRae is the only one who didn't order something alcoholic. The waitress sets a Virgin Mary in front of her. "Not quite. If you knew x and y, you could easily figure the chances of withdrawing at least one black marble with combinations and permutations, but working backwards from the chances probably requires a computer program. Certainly coming up with the general case does."

The waitress has distributed the last of the drinks. "Dinner comes with soup and salad. For the entree, you have a choice of filet mignon, chicken Jerusalem, veal Marsala, or poached salmon. Does anybody want anything else from the bar before I take your orders?"

Scrivener refills his glass. "Yes, I'd like another Watney's. Tell me, is the fish fresh?"

"Yes, it is."

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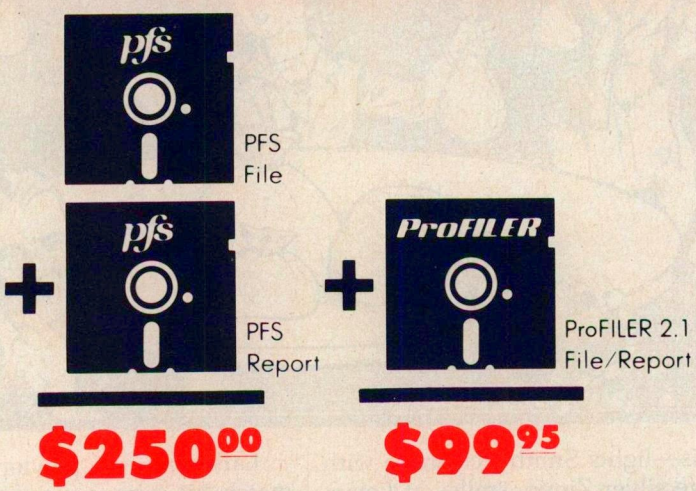

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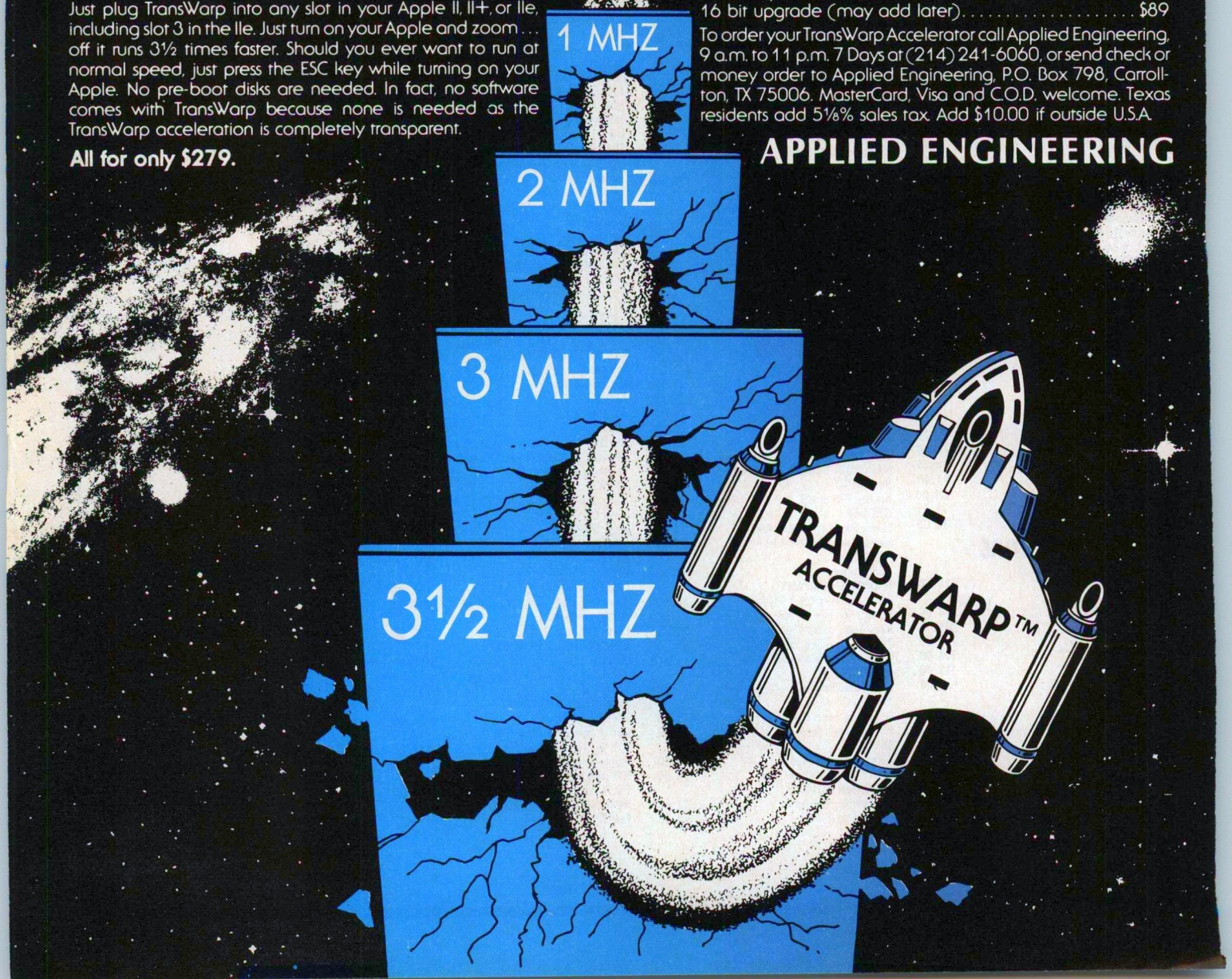

Your program (or piece of program) can be in any programming language that runs on an Apple II or a Mac.

Well, we're not going to sit through this whole meal with the I-Q group, delightful as it sounds. I can tell you that half of the group will order fish, and the other half meat. Of that half, half will get the filet and half the chicken. All but one will take their salads with house dressing, and that one will have Roquefort. In a rare display of consistency, all will choose cherries jubilee for dessert, in preference to the Grand Marnier souffle. Except for McRae and Mrs. Gilbert, everybody will have too much to drink. I will leave it up to you to sort it out who orders precisely what and whether they all make it safely home and if anyone gets into a serious argument. Or you can wait and read the next installment to see who's in what kind of shape.

The Challenge

OK, go to it. Devise a program that determines how many marbles, x, when withdrawn from a bag containing what total, y marbles, for the specific case of two black marbles, gives an exactly even chance of ending up with at least one black marble. The same program also produces the values of x and y when any number of black marbles is specified. Your program (or piece of program) can be in any programming language that runs on an Apple II or a Mac. The best solution wins you a one-year subscription to *A+* and a Certificate of Excellence in Programming and will be published here. Remember that a good program is self-documenting.

All entries for this month's contest must be received by February 12, 1986. Please send all entries to Computer Calisthenics, c/o *A+* Magazine, 11 Davis Drive, Belmont, CA 94002. If you want us to return your entry, please be sure to enclose a self-addressed, stamped envelope or diskette mailer. The winner will be selected by the author, whose decision will be final. The winning program will be announced in an upcoming issue of *A+*. ✚

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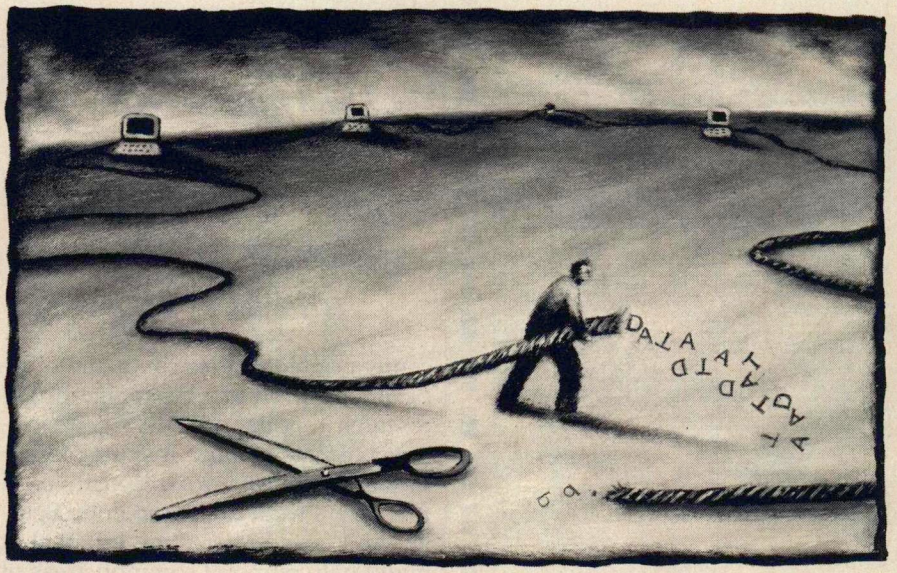
BY RUSS LOCKWOOD

HEROES, HACKERS, AND HELP

New on-line services, a chat with a hacker, and a list of teletips



As the Christmas holidays fade into memory and the new year beckons, the pace of telecommunications analysis seems to be slackening. This momentary breather bodes neither ill nor fair for the industry—most of the spectacular service starts and stops have already occurred. Rather, it is a time to gather information and conduct research.

Perhaps the most spectacular, and unexpected, service halt was the much ballyhooed Computer Industry Daily. The $1500-per-year business service from publishing giant Ziff-Davis, delivered daily over the MCI Mail network, never attracted enough customers. It also never quite realized the full potential of telecommunications delivery.

Just as quickly as Ziff-Davis exited from the telecommunications realm, however, another giant stepped right in. General Electric Information Services announced a new service, Genie, aimed squarely at personal-computer owners and competing directly with CompuServe, The Source, Delphi, and other general telecommunications services.

Genie charges $5 per hour for non-prime-time access (roughly 6 P.M. to 8 A.M. weekdays and all day weekends) at both 300 and 1200 bps. Prime-time access costs $35 per hour. Genie can offer the bargain-basement price by tapping the unused capacity of the General Electric network. Three "round tables" (special-interest groups) are now active, each with electronic mail, real-time conferencing, and other interactive aspects.

Finally, someone has figured out that users should be charged per connection, without surcharges for higher speed. At $5 per hour, 1200-bps service is a real deal. Compare that to $12.50 for CompuServe, and you see what I mean. The dearth of Genie's offerings is a hindrance, though. Other new services, such as PlayNet and American People Link, have failed to make an impact because they couldn't provide the depth necessary to compete with the entrenched services. I'll take a closer look at Genie in an upcoming column.

Just as quickly as Ziff-Davis exited from the telecommunications realm, another giant stepped right in.

Another Bargain

Viewtron, a general on-line service from Viewdata, a subsidiary of Knight-Ridder Newspapers, has opened its lines to Apple owners. Started in Florida as a videotex service (available only through a $600 dedicated terminal), Viewdata quickly discovered that a personal computer acts like a terminal and started customizing software for the IBM PC, Commodore 64, and Apple II.

Viewtron boasts quite a selection of services: international and national news (to be bolstered by local news in the future), home banking, electronic mail, on-line conferences, a few games, and other information. The cost? Just $9.95 to start and $5.40 per non-prime-time hour at either 300 or 1200 bps. Again, a good deal and a smart move.

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Cracking Techniques, full of tips and tricks of disk copying and cracking, which are complete sell outs at the many computer shows, are now being made available through mail order.

These highly specialized disks contain tips and techniques provided by the top crackers of the world. Anyone who has traveled the vast electronic highways of the computer bulletin boards will easily recognize these famous names: Apple Bandit, Disk Zapper, Red Rebel, Long John Silver, Axe Man, The Burglar, Captain Nibble, Mr. Xerox, Lockbuster, The Colossus, Mister C, Bozo NYC, Clone Man, Reset Vector, The Prisoner, REO Software, Parity Error, Woodpecker, The Beast, Trystan II, the Pongus, Jim Phelps, The Marauder, and the Disk Jockey. Some of these famous software pirates have been featured on ABC's NIGHTLINE, NBC's TODAY, in Newsweek, Infoworld, Tech Weekly, and in the New York Times. You can find out why all these people have earned their heavy reputations! Here now are the techniques that made them famous.

Included on the disks are full descriptions on the use and applications of DEMUFFIN and DEMUFFIN+, techniques for modifying a 16k RAM card into a fake ROM, a dissertation on special techniques, Non Maskable Interrupts, Boot Tracing, Brute Force, and several sections on handling Foreign DOS. The internationally famous Axe Man has several detailed sections on different techniques including "How to use a RAM card as a major cracking tool." Also included are the complete programming codes for building your own copies of the legendary Bozo's Cracker ROM and the Lockbuster's F8 ROM. Contains seven (7) Apple Bandit files including how to really use Copy][+ and the super COPYB and the enhanced COPYA from the Disk Jockey.

All of the information gathered together on these disks are the highlights of the 1982-85 pirating season as featured on the infamous Boston Pirate's Harbor bulletin board. Pirates Harbor has long been established as the international Mecca of software cracking. As an added bonus, complete cracking instructions are provided for many of the top pieces of software, both for games and business. These are not obscure, arcane pieces of lore; they are practical tips and techniques that you can start applying immediately the day you receive your disks.

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CIRCLE 275 ON READER SERVICE CARD

executive-outplacement firm, does all this and also uses telecommunications to give its clients an edge. Using Apple IIIs and Macintoshes, Seagate scours several on-line services for information about a particular target company.

The demise of *Creative Computing* has sent me back to pounding the pavement looking for new employment. So I asked Seagate to give me information about Apple Computer. I figure with the changing of the guard, or at least the management, opportunity may be knocking.

The 39-page report Seagate sent me is packed with information: facts and numbers from the annual report, abstracts and full-text versions of recently printed articles concerning Apple and its products, brokerage-house research reports, advertising, assignment of patents, and a short biography of the interviewing executive. In this case, I went to the top, John Sculley, and found interesting tidbits that might help pinpoint common areas of interest.

Determined hackers soon gain access into the netherworld, discovering codes, tips, and techniques.

I should point out that Seagate will accept you as a client only with the blessing of a check from your ex-employer. It does not accept or perform searches for individuals. Companies that want to place their executives can contact Seagate at Paramus Plaza 4, 12 Route 17 North, Paramus, NJ 07652.

Telecommunications and Woz

The September and October 1985 issues of *Computer Living NY/NJ* newspaper (5793 Tyndall Avenue, Riverdale, NY 10471) features an interview with Steve Wozniak. In and among the usual questions about Apple, Cloud 9, and Steve Jobs is the question "What do you use computers for at home?"

One answer is home banking. Wozniak has a IIc with an LCD screen set up in his bedroom dedicated to logging into his bank account. He says it saves him some time.

On the other hand, Wozniak used to book airline reservations through The Source but gave it up because it was easier to make one phone call to a travel agent. Win some, lose some.

The Hackers Strike Back

After I pointed out the dark side of hacking in my December column, I think hackers are entitled to reply—preferably without breaking into my CompuServe account. So I contacted one, or, rather, one contacted me. The result of the on-line interview is an interesting look into the netherworld of telecommunications.

A hacker, so my hacker tells me, is someone who "illegally breaks into a computer system." To do so increases the prestige of the person. The motivation? Mostly fun, although some claim they want to stop corporations from spying into our lives.

Bulletin-board systems (BBSs) are indeed a major conduit of information. According to the hacker, recent efforts to shut down BBSs that post major-credit-card numbers are having the desired effect—fewer major-credit-card numbers are being posted—but hackers are more interested in calling-card numbers (to make free phone calls), telephone numbers of systems, and access codes. Do you remember any news stories about an unsuspecting homeowner getting a $100,000 phone bill? Chances are it was hackers and "phone phreaks" at work.

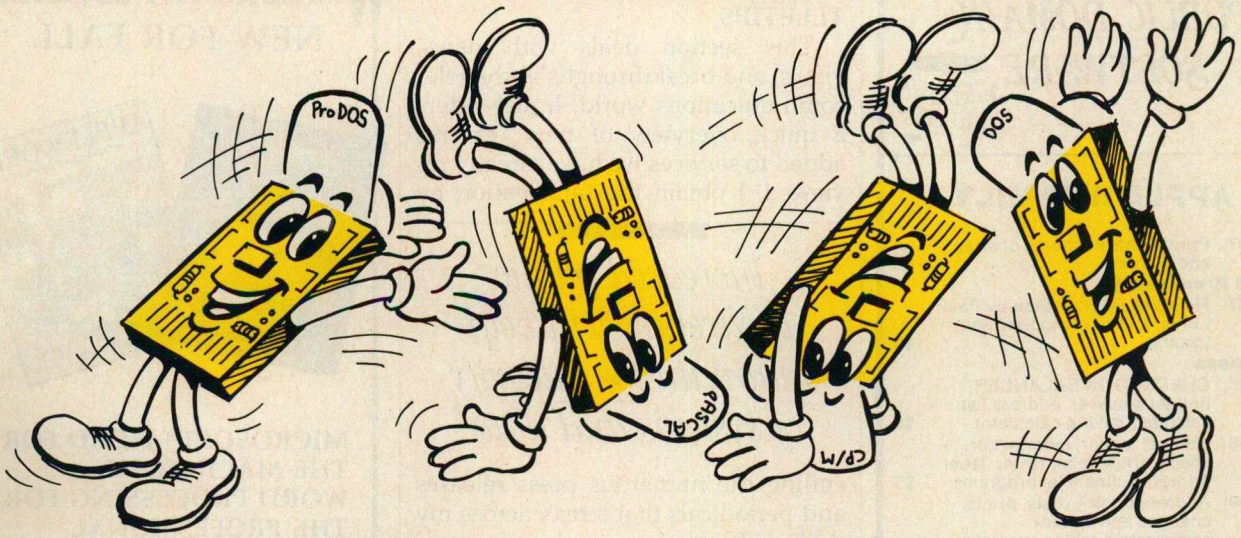
The hacker contends that hackers generally just want to look around a system. The thrill lies more in breaking in than in exiting with something. But what about the horror stories of erased data? My contact responds that hackers "think it's cool, but usually nobody does it, only the occasional jerk."

For my hacker, the process started with the purchase of a modem and calling a BBS. One BBS leads to another, and you are soon into the fraternity. Hackers do "ask you to log off if you are a Fed." Determined hackers soon gain access into the netherworld, discovering codes, tips, and techniques. My contact "tried some. They worked. I loved it; it was like *WarGames*." The initial learning processing took only three months.

It seems the only way to stop hackers, short of cutting outside lines, is a massive effort to trace calls—but the really top-notch hackers route their signals through pay phones.

So that is one hacker's story, an interesting blend of curiosity, determination, and admission of guilt.

THE INSTANT MULTI-PROGRAM APPLE



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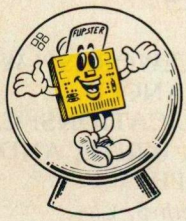

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Although no system is truly unbreakable, increased vigilance, security, and public awareness will help maintain the integrity of systems and data.

TELETIPS

This section deals with news, views, and breakthroughs in the telecommunications world. It also offers a quick overview of new features added to services we have already reviewed. I obtain the information by culling the numerous press releases and periodicals that streak across my desk each day.

Increased public awareness will help maintain the integrity of systems and data.

BBS Bill

U.S. Senator Paul S. Tribble has proposed a bill, the Computer Pornography and Child Exploitation Act, to stop the use of BBSs for posting names, addresses, and phone numbers of minors for the purpose of sexual activity with adults. Widespread opposition, from the American Civil Liberties Union, users' groups, and CompuServe over who would be responsible for monitoring individual messages has forced Tribble to rewrite portions of the bill, however. It will supposedly be reworded to make prosecutors prove criminal intent to gain a conviction.

Real BBS

Electronic Odyssey is a BBS for creative writers. Run on an Apple IIe, 300/1200 Apple-Cat modem, and 20-megabyte Infax hard disk with T-Net ProDOS BBS software, it boasts an active membership—in part because if you do not log on for 30 days, system operator "Elton Word" kicks you off.

Mr. Word notes that "very often articles from *A+* are excerpted and posted on the Odyssey, simply because it is the best resource for Apple news that we can find." Closer to home, Mr. Word says, "Thanks for exploring and shedding light on the modem world." Our pleasure.

Smart Apples

The Smart Apple Club boasts three BBSs, a newsletter, a public-domain library, and demonstrations of software. Dues are $30 per year.

"10 Most Wanted"

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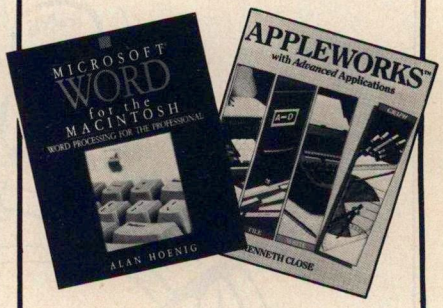

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CompuServe has posted biographies and graphic pictures of the fugitives on the FBI's 10 Most Wanted List.

raphies and graphic pictures of the fugitives on the FBI's 10 Most Wanted List. Note that since 1950, when the "10 Most Wanted" program started, 366 fugitives have been caught—109 of the apprehensions were the result of citizen cooperation.

PACsmen

The November elections may be many months away, but for congressmen, funding from political-action committees requires everyday attention. *After* the 1984 elections, more than $30 million was left in incumbents' warchests for the 1986 campaign. A total of 117 congressmen had more than $100,000 each in unspent contributions. This information and more is available from the on-line version of the PACs and Lobbies newsletter available from NewsNet.

100th Edition

Newsbytes, a weekly on-line newsletter about the personal-computer industry available on The Source, has published its 100th edition. The newsletter started in 1983 and was the first service to graduate from the member-publishing section to being an official on-line service.

New Dow Jones Software

Dow Jones Information Services has released Marketing Manager Plus software for the Apple IIe and IIc. The program provides automatic valuation of stocks, bonds, Treasury issues, options, and mutal funds through market data provided by Dow Jones News/Retrieval. It controls up to 26 different portfolios and retails for $249.

More Macommunications

Aegis Development, perhaps best known for its Mac Challenger spaceshuttle simulator, has introduced Mac Mail Telecom, a telecommunications program for the Macintosh. Priced at $59.95, the program features Mac Binary and XMODEM protocols, automatic log-in, electronic telephone and address book, auto-answer, and VT-100 and VT-52 emulation.

Who's Number 1?

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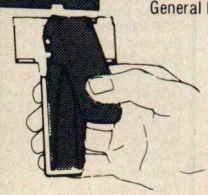

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D.C., CompuServe edges out Dow Jones, 250,000 to 220,000 subscribers. The Source is far behind with 65,000.

Logging Off

Because of circumstances beyond my control, my CompuServe PPN 70210,750 may or may not be operating by the time you see this column. I am in the process of obtaining a new number. Meanwhile, if you wish to reach me, drop a (postal-service) letter to *A+* (11 Davis Drive, Belmont, CA 94002) or an MCI E-mail to APLUS. Until next time, may your modem signal be strong and true. ✚

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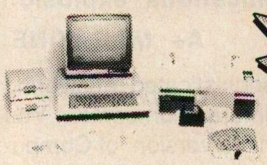

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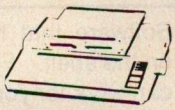

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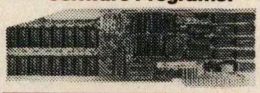

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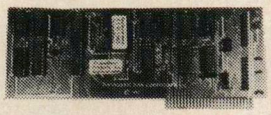

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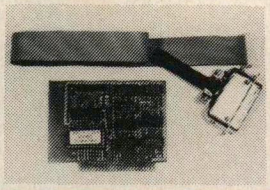

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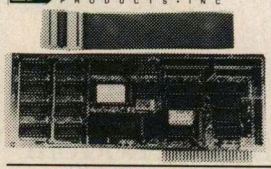

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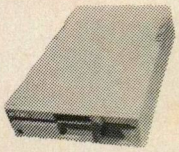

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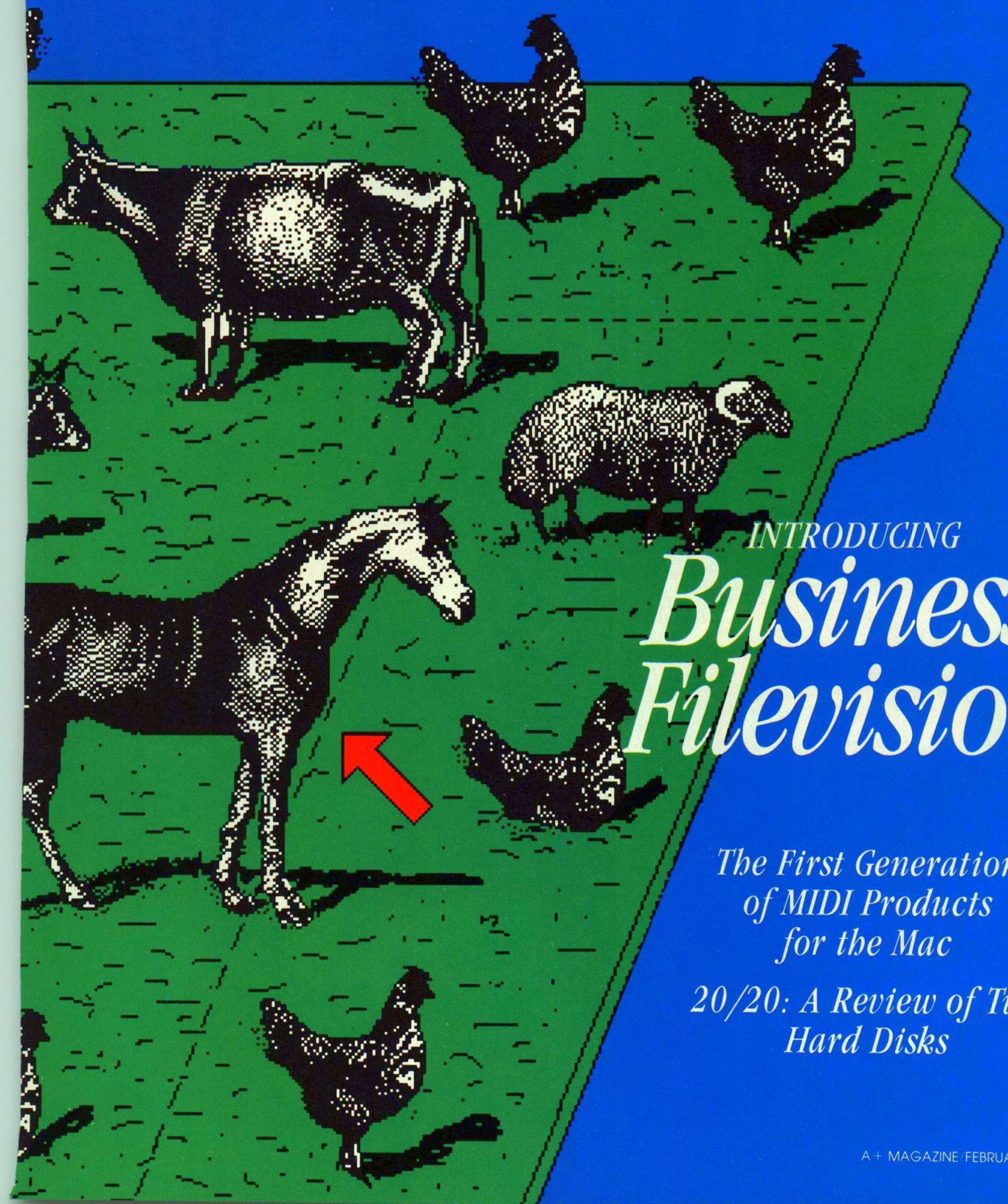

INTRODUCING

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The First Generation of MIDI Products for the Mac

20/20: A Review of Two Hard Disks

BY FREFF

Midi

MIDI FOR THE MACINTOSH

The first generation of products

When MIDI first showed up, it brought with it the notion of controlling your musical instruments with a personal computer. Your synthesizers, drum machines, and samplers would be able to play and sing in ways hitherto undreamt of.

True enough, these abilities are now possible, but you need software to realize the potential of the hardware. As always, whenever a new technology or system hits the scene, we've seen a bad case of software lag as a small number of programmers and companies tackle a large number of complex new problems, from conceptual design, coding, and bug removal, on up to the real-world hassles of manufacturing and finance. The Macintosh has been a particular victim of this syndrome. Months after the music-industry magazines were blooming with MIDI-software ads for Atari, Commodore, Apple II, and IBM PC computers, all the Mac could claim were rumors, promises, and rumors of promises.

That situation, thankfully, is changing. MIDI interfaces and software packages for the Mac are being shipped at last.

Because we're in the very first generation of Mac MIDI software, things are changing fast. Some of the products covered here were altered radically just during the review period; others seem to hover in a state of eternally receding beta-test, with no firm release date in sight. All bets are off about what shape any of these software packages will take after a few months in the marketplace.

So gather around your MIDI devices, plug in your cables, slip in your disks, and double-click on the icon of your choice. There's plenty of musical pleasure (and profit?) to pursue. But keep a healthy eye open while you're at it and let the software writers know what you like and dislike—above all, let them know what you need. There's room for improvement in the land of Mac and MIDI, and you can have a hand in it.

MIDI interfaces and software packages for the Mac are being shipped at last.

That consumer notice behind us, let's dig in.

THE HARDWARE

Before your Mac can talk to anything through MIDI, it needs a set of MIDI jacks of its own, which means you need a special MIDI interface that connects to the Mac's printer or modem port.

Luckily, there are four interfaces to choose from. Unluckily, all of them are in extremely short supply at the time of this writing. Even more unluckily, it isn't clear yet whether any of them will work with all MIDI programs for the Macintosh (a competitive design feature may force you to purchase more than one, depending on what software you deem critical).

The MacMIDI Star interface from Musicworks (a Boston-based company not related to the MusicWorks program created by Macromind, Inc., and distributed by Hayden Software) is a relatively plain white box. A foot-long cable connects the box to the Mac. The connector has no screws—Musicworks judged tripping over a MIDI cable and unplugging the interface preferable to damaging the cable itself, and I tend to agree. On the sides of the box are two guitar-type jacks and six MIDI jacks, but the guitar jacks and one of the MIDI jacks are reserved for future interfaces that will deal with sync and SMPTE (Society of Motion Picture and Television Engineers) time code, which the MacMIDI Star does not (unless you're doing serious multitrack recording, the lack of function in these jacks should not concern you). What you do get is one MIDI IN, four MIDI OUTs, and an icon-based label that makes it perfectly clear how to hook up a basic network consisting of a Mac, a master keyboard, and three "slave devices" (any other MIDI equipment will do).

The Opcode interface from Opcode Systems is simple and direct. It's a narrow, rectangular metal box that screws directly into one of the serial ports, so that it seems to be clinging to the back of your Mac. Nothing attaches it at the top, so don't bang it or pull hard on the cables you plug into its MIDI IN and OUT jacks; too much torque might do damage to the interface's connector or the Mac's port. Because of the unit's narrow profile, you can actually hook up two of them, one to each serial port, to increase flexibility in recording and playback.

The Assimilation Process MIDI Conductor interface, with its molded plastic case, its knobbed connector screws, and its Mac-matching color,

TOM LULEVITCH

looks like it rolled off the assembly line from Apple itself. On one side is a pleasant and practical surprise in the form of another serial port that lets you hook the interface to the Mac without orphaning whatever accessory was originally plugged in there. Of questionable practical value is the location of the MIDI IN and OUT jacks at the end of two six-foot cables that sprout from the base of the interface. For some setups, fine—but you'd be surprised how short six feet turns out to be when you're winding cables in and around a keyboard setup or from place to place in a studio. Be prepared to rearrange things or buy special adapters and/or MIDI THRU boxes in order to make the reach.

The makers of all of these interfaces claim they can run every available MIDI program for the Mac. Unfortunately, their assertion is not true, and the fourth available interface is the reason why.

The box in question was unavailable for review because of short supplies, but what it is (and why) is a lesson in practical economics, small-start-up style. It's the Southworth Music Systems interface, designed to be the hardware key in the copy-protection scheme of Southworth's Total Music program. After examining all the available disk-protection schemes and concluding that they were worthless, the company opted to give up protecting its disks and instead rig the system so that each copy of the program would run with one (and only one) specific interface: the one you get when you buy Total Music from Southworth.

On the plus side, archival copies become a snap, and the interface itself has two MIDI INs, which Total Music takes advantage of, letting you record simultaneously on two separate MIDI channels. That's great stuff and very useful when you're composing through improvisation with a friend. The interface also has a functioning sync jack. On the minus side, you have to carry your own interface—instead of just software—with you if you want to travel with the system. It also means that you have wasted your money if you want to work with Total Music but have already invested in another interface.

Editing programs let you get in and manipulate program information.

Total Music is good enough to make many people shell out the bucks for a second piece of hardware, yet I wonder just how long it will be before some other company, with equally interesting software, tries a similar scheme in retaliation? And what happens to Southworth's market position if its product distribution gets held up by manufacturing problems or shortfalls?

THE SOFTWARE

After a couple of years of development, MIDI software is starting to fall into distinct categories, within which programs show marked similarities (just the same as with many spreadsheets or databases). The three basic types are librarians, editors, and sequencers. Sequencers can be further divided by whether or not they deal with music notation.

Librarians

Modern synthesizers are full of sounds—so many, in fact, that most of the time you can't keep track of them and the rest of the time you just stumble through the presets until something catches your ear's fancy. This method isn't terribly efficient, especially if you've collected or designed a lot of sounds. Furthermore, a big sound library can be an expensive proposition, what with RAM cartridges holding only 32 presets (if that) and costing upwards of $90.

Enter the friendly librarian program. All it does is organize your sounds, but that's a godsend, involving as it does the capacity to collect them into related groups, give them reference names, zap them over to your synthesizer or back in a matter of seconds, and save money. Where do you save? Simple. Consider, on the one hand, the $90 cartridge with its 32 presets. Then consider that the average $4 floppy disk can store 800 presets or more. All by itself, a single storage disk can save you the entire cost of a 512K Mac!

Librarian programs work by recording and sending a kind of MIDI information called system-exclusive data. These are codes that follow the MIDI format but that any manufacturer can use in any way it pleases, to represent the internal workings of a particular instrument. Sometimes these uses are rather quirky, and a good library program has to cope, which means the programmer has to know the instrument in question inside and out—not easy in a rapidly changing marketplace. Thus, we have good reason to applaud Opcode Systems for its series of MIDIMAC Librarian programs. Currently the series includes more than nine programs (more than any other company provides, for any computer), covering the gamut from extremely popular synthesizers such as the Yamaha DX7 and Casio CZ-101 to powerful but less ubiquitous instruments such as the Oberheim OB-8, Xpander, and Matrix; the Roland Juno-106 and JX-8P; and others from Korg and Sequential. At $50 each, these programs are a steal.

Another solid and reliable program is Musicwork's DX/TX Librarian, which takes you half a step into editing by letting you make limited transfers of patch data from one voice to another in a process called merging. (Any DX7 owners in the audience should be aware that merging is possible only between voices that use the same algorithm.) DX/TX Librarian has another nifty option that lets you automatically load sounds into the DX7 *and* trigger a middle-C reference note, letting you search for the sound of your dreams without once having to get up from your Mac to play the DX7's keyboard.

Editors

Editing programs go one step further than librarians. Instead of just storing program information for you, they actually let you get in and manipulate it to your own tastes. Want a sound to fade longer, or be arpeggiated differently, or have a changing timbre over time? The Macintosh is ideal for the task, especially given the

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power of the Mac's screen graphics.

Unfortunately, not a single Macintosh MIDI editor is on the market as of this writing. Well, not quite . . .

One of the most amazing Macintosh packages in existence—and likely, at $1000, the most expensive—is a special program for the Emulator II called Sound Designer. It was created by Digidesign, Inc. (the folks behind the Assimilation MIDI interface), and although it doesn't use standard MIDI, it does use a MIDI variation, over a high-speed RS-422 serial line, to give you total control over both the Emulator II and any sound that it can play. Since the EII is a sampling keyboard, you get to play directly with digitally recorded sounds, cutting and shaping them to your will.

A full discussion of the power and implications of Sound Designer would fill a moderately thick book. The program takes an $8000 Emulator II and gives it powers previously unavailable for less than $40,000–$50,000. Consider that with Sound Designer you can edit a recorded sound with such smoothness and precision that it is absolutely impossible for anyone, no matter how expert, to tell that an edit has been made.

The ramifications of this product will be interesting to watch. In the meantime, less dramatic and more commonly useful synthesizer editors should appear for sale within the year.

Sequencers

Sequencers are where the Mac/MIDI software action heats up, in a battle (more often than not) of convenience vs. features.

Sequencer software turns your MIDI synthesizer into the equivalent of a recording player piano. To describe it simply: You play, the computer keeps track of what notes you press down and release, and then the computer returns that data to the synthesizer on playback. You won't see anything happening, but as far as the microprocessor in the synthesizer is concerned, the ivories are being tickled, and so it generates the same sounds you heard when you played it yourself.

That's the basic ticket. Simple sequencers, such as Assimilation's

There's nothing like hearing the results of what you've just written.

MIDI Composer, add on a few tracks (four), a metronome, and a tempo control, and give you an easy handle on the process—in this case, a display not unlike the operating controls of a tape desk. There's even a tape counter and a picture of a cassette with reels that roll as the music plays.

Beyond muting or rerecording a track, it has no editing power, though. You can't remove a note or add one that was never played, or change pitch, note length, start time, aftertouch, or any of the many other kinds of MIDI data that synthesizers send out as they are played.

If you want to edit a recording you've made, you'll need a more complex sequencer, such as Musicworks of Boston's MegaTrack, Opcode's MIDIMAC Sequencers, or Southworth Music System's Total Music. Each is a step up in recording and editing power, but at a price. The more power, the greater the complexity of operation and the higher the learning curve you'll have to climb.

It comes down to choice. Think about what you want to do and then pick a program based on how serious you want to get, how much you want to spend, and how important notation is to your music making.

The Mac's graphics have made notation—staffs, notes, measures, time signatures, and the rest of it—a much more serious part of sequencers than it is for other computers. For instance, Deluxe Music Construction Set from Electronic Arts lets you drive synthesizers from scores you write on the computer screen. Advance looks indicate that it will be complete in its attention to musical detail, and for people versed in notation, it may well be ideal. A similar (but less musically complete) MIDI version of the excellent Concertware+ will be available by the time you read this. And Musicworks of Boston makes a program called MIDIWorks that can take files from non-MIDI versions of Concertware+ and other score-generating Mac programs and convert them into files that *can* play synthesizers directly. If you are not conversant with music notation but want to learn, any of these programs are excellent choices. There's nothing like hearing the results of what you've written to let you know where your writing has gone astray.

Music played from scores is only one side of the coin. Of far greater interest to musicians is finding a miracle program that takes what they dash off at the keyboard and notates it quickly and accurately.

Fat chance—for a while, anyway, because of the incredible complexity of the task and the still limited powers of modern microcomputers. Difficulty never did stop programmers from taking a crack at something, though, so you can find programs that give automatic notation a good try. Total Music is one. Another is an announced but unseen product called Performer from Mark of the Unicorn, which is a sequencer with files that can be converted into notation by a sister product, the well-respected Professional Composer.

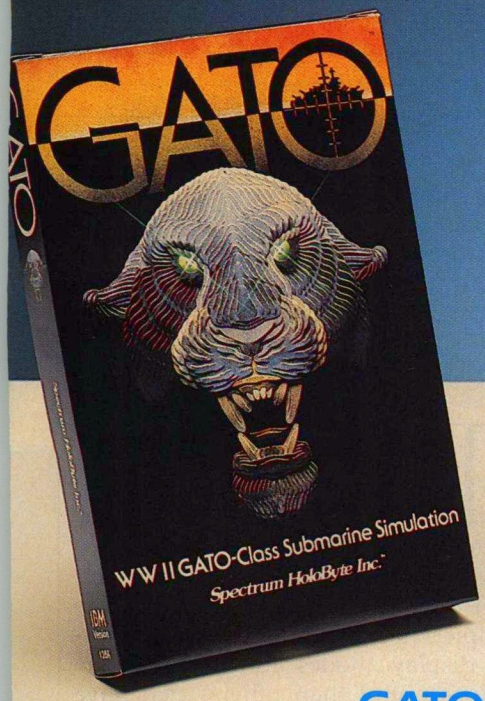
MegaTrack, MIDIMAC Sequencer, and Total Music are for when you're really serious about multitrack composition. I don't recommend them to hobbyists (well, maybe *very* dedicated hobbyists) or people without at least three MIDI synthesizers. Short of that, you aren't really making the programs puff, let alone breathe hard.

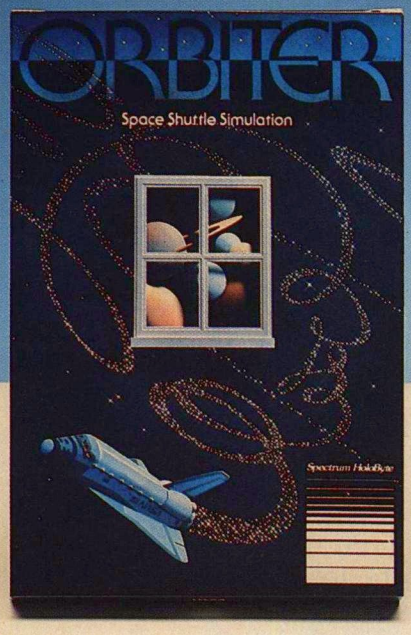
But boy, are they fun.

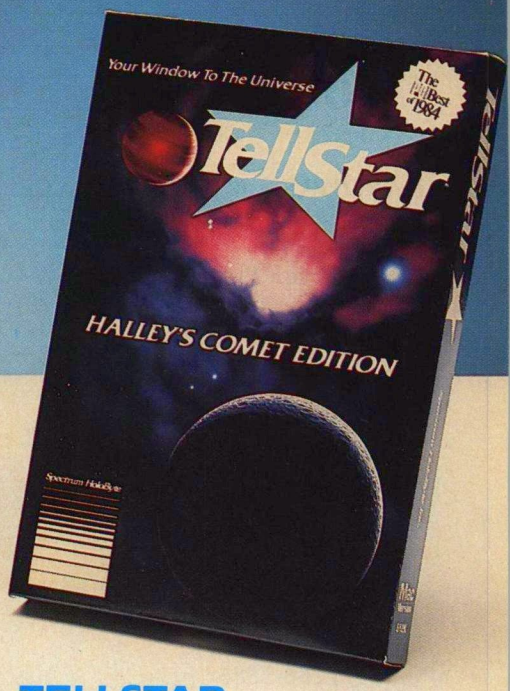
Listing their features could take until next Sunday (the manual for Total Music is lean at 179 pages), so I'll restrict myself to saying that these programs are, in a very real sense, instruments in their own right, and each has its own personality.

MegaTrack is direct and pretty much follows the conceptual model of an open-reel tape deck (as with MIDI Composer, you do get to see the wheel turn).

MIDIMac is drier. It makes no pretense of notation; your interface is a series of screens that, at first glance,







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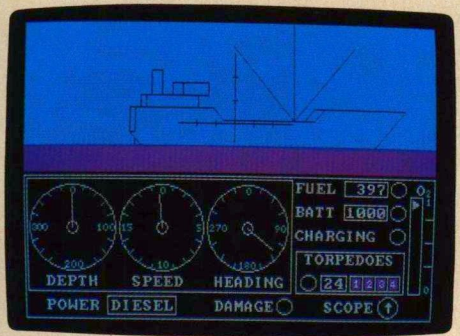

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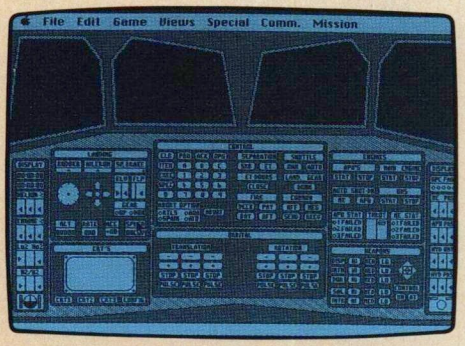

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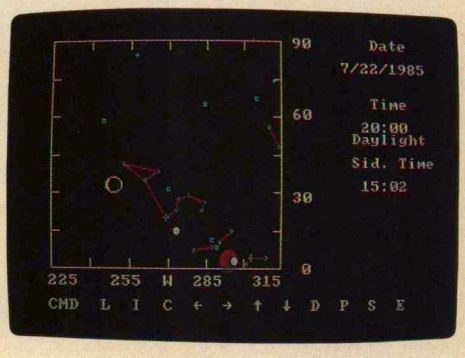

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PRODUCT INFORMATION

HARDWARE (MIDI INTERFACES)

Assimilation Process MIDI Conductor
Assimilation Process
20833 Stevens Creek Boulevard
Suite 101
Cupertino, CA 95014
(408) 356-6241
List Price: $89
Requires: Macintosh

Musicworks MacMIDI Star
Musicworks
18 Haviland
Boston, MA 02115
(617) 266-2886
List Price: $80
Requires: Macintosh

Opcode Systems Interface
Opcode Systems
1040 Ramona
Palo Alto, CA 94301
(415) 321-8977
List Price: $125
Requires: Macintosh

Southworth Music Systems Interface
Southworth Music Systems, Inc.
Box 275 RD1
Harvard, MA 01451
(617) 497-7522
List Price: sold only with Total Music software, $489 total
Requires: Macintosh 512K

MIDI SOFTWARE

MIDI Composer
Assimilation Process
20833 Stevens Creek Boulevard
Suite 101
Cupertino, CA 95014
(408) 356-6241
List Price: $29
Requires: Macintosh

Sound Designer
Digidesign, Inc.
920 Commercial Street
Palo Alto, CA 94303
(415) 494-8811
List Price: $1000
Requires: Macintosh 512K, second disk drive, Emulator II from E-Mu Systems, Inc.

Deluxe Music Construction Set
Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171
List Price: $49.95
Requires: Macintosh

MIDI Concertware+
Great Wave Software
P.O. Box 5847
Stanford, CA 94305
(415) 325-2202
List Price: $139.95
Requires: Macintosh 512K

Performer
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Cambridge, MA 02142
(617) 576-2760
List Price: $295
Requires: Macintosh 512K

Musicworks Software
Musicworks
18 Haviland
Boston, MA 02115
(617) 266-2886
List Price: MegaTrack, $150; MIDIWorks, $100; DX/TX Librarian, $150
Require: Macintosh

Opcode Systems Software
Opcode Systems
1040 Ramona
Palo Alto, CA 94301
(415) 321-8977
List Price: MIDIMAC Sequencer, $150; MIDIMAC Librarian Series (DX7; CZ-101/1000; Oberheim OB-8, Xpander, Matrix, Roland JX8P, and Juno-106; others), $50 each
Require: MIDIMAC Sequencer—Macintosh 512K; all the other programs—Macintosh

Total Music
Southworth Music Systems
Box 275 RD1
Harvard, MA 01451
(617) 497-7522
List Price: $489 (includes Southworth Music Systems MIDI Interface)
Requires: Macintosh 512K

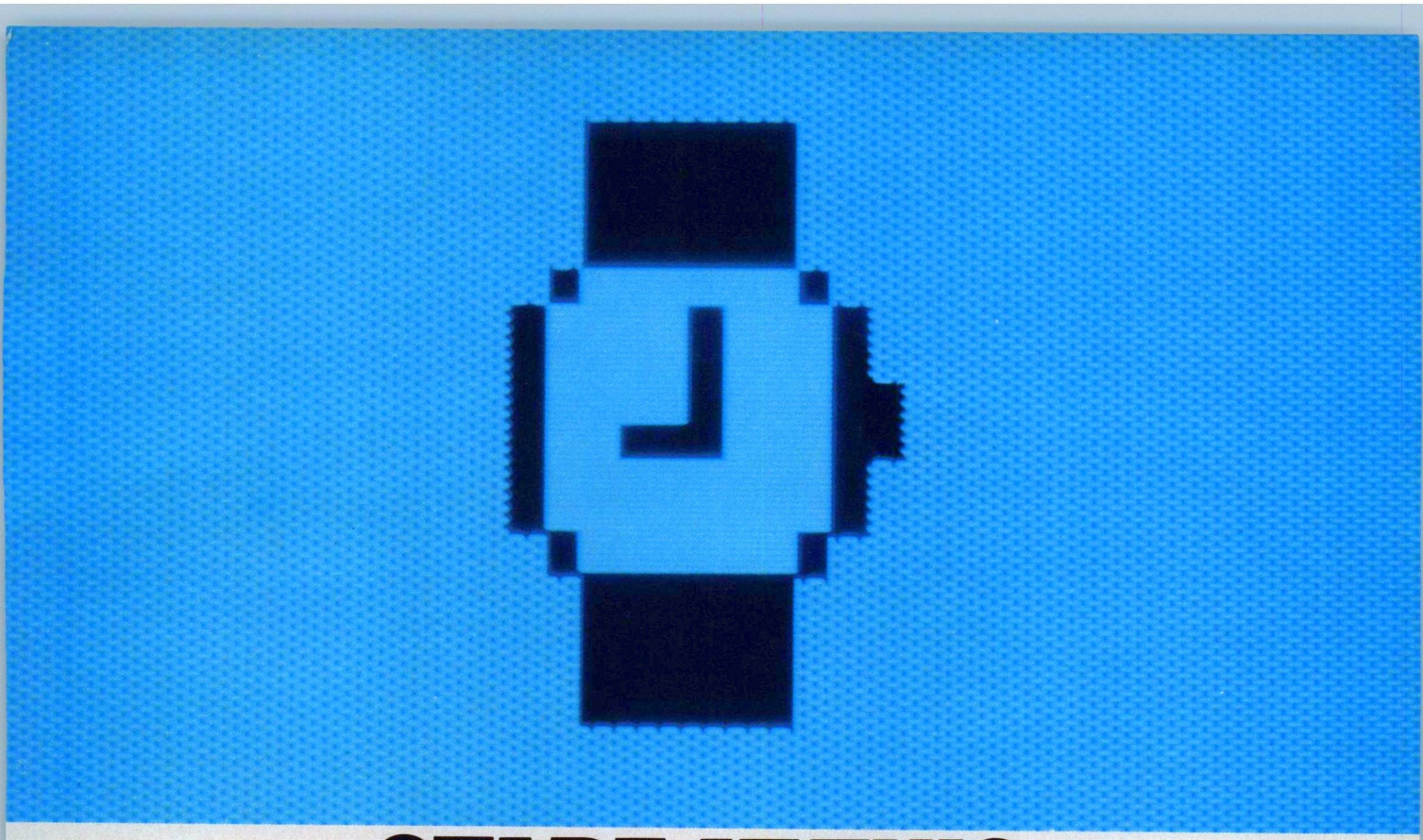
resemble a Mac spreadsheet. Just about anything of a MIDI or musical nature is quick and easy once you've learned your way around the program. In some ways, this is my favorite sequencer program, in terms of striking a solid compromise between power and a practical learning curve.

Total Music is both the killer and the question mark, trying very hard to be all things to all musicians. Total Music can notate from your recordings and play synthesizers from your notation, with an editing resolution of 128th-note triplets. It has several different graphic-display modes for music (some more useful than others) that have nothing to do with standard notation. It can sync to the most sophisticated professional time codes, such as SMPTE. It lets you record notes in real time (actual playing) or in step fashion (one note at a time, letting the computer take care of properly adjusting the rhythm). It lets you overdub as many times as you want on any or all 16 MIDI channels. It can serve as a DX7 or TX-rack librarian. It allows you to punch in and overdub anywhere in a track. It lets you "slide" tracks in minuscule time increments to create special effects such as MIDI echoes or choruses or to correct timing problems that result when you pump too much MIDI data through the serial port at once.

Power, sheer power—but also difficult to absorb, and something of a mystery. Total Music went through major revisions in the course of this review. The version now being shipped has, according to the folks at Southworth, even more changes. They say that the power has been better tamed, the features made more accessible. I hope so. Because if they are, Total Music can make a strong claim to being the best sequencer software in the world, instead of only the best for the Mac. +

For more MIDI information, see pages 26–54 in this issue.

Freff is a contributing editor of Musician *magazine and the American reporter for a weekly BBC television show called "Micro Live." He also runs his own MIDI-equipped recording studio.*



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HARDWARE

BY W. CHARLES DOHERTY

MACINTOSH HARD DISK 20 / HYPERDRIVE 20

The Hyperdrive 20 and the Macintosh Hard Disk 20 are two viable alternatives to floppy frustration.

When you begin using a Macintosh for serious applications, its storage limitations soon get underfoot. Frustrating disk swaps and Disk full messages, compounded by long waits for data retrieval, make even a simple task seem complex.

Adding a mass-storage device to the Mac is the most effective way of increasing the machine's capabilities while retaining its ease of operation. Although mass-storage systems—hard disks—have traditionally been costly, recent technological advances and price reductions have made high-capacity hard disks a viable alternative to floppy frustration.

Two major contenders in the Macintosh storage-system arena are Apple's new Macintosh Hard Disk 20 and the internally mounted Hyperdrive 20 from General Computer Company. Each unit offers as much storage capacity as 50 standard Mac disks do, along with much faster performance and easier operation. Adding either unit to a Macintosh 512K will give you the power to tackle the most complex operations and will make day-to-day activities a breeze.

The most obvious difference between the Hard Disk 20 and the Hyperdrive is physical layout. Apple's hard disk fits directly below the Macintosh, having the same length and width as the computer and standing just three inches high. The drive connects to the Mac through the external-disk-drive connector. A similar connector on the back of the hard disk lets you hook an external floppy-disk drive to your system or even use two hard disks in tandem for 40 megabytes of storage.

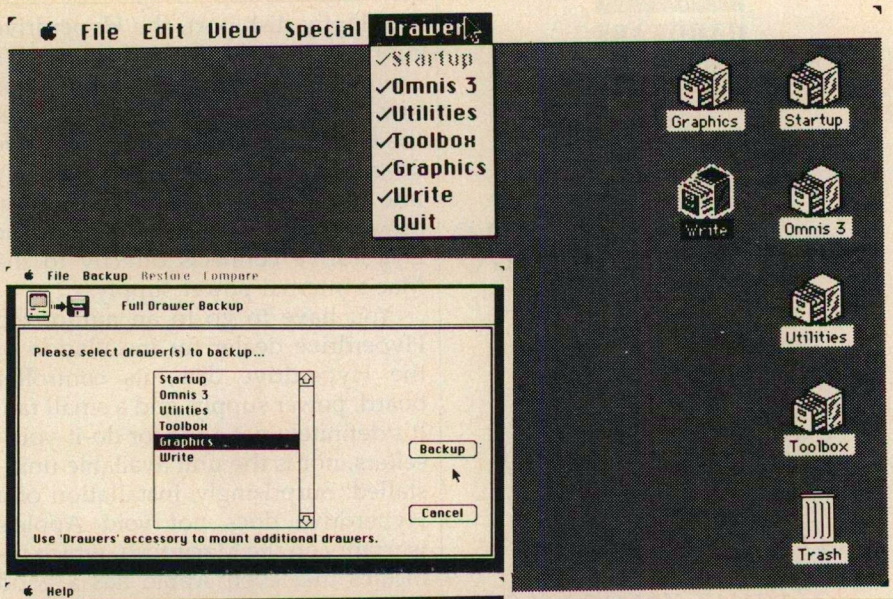
A rear-mounted power switch is the Apple drive's only control, and a small light on the front panel lets you know when the unit is active. With its finish and external dimensions, the same as those of the Macintosh computer, the Hard Disk 20 looks attractive in place.

In contrast, the Hyperdrive 20 mounts within the Macintosh itself. Rather than communicating through the floppy-disk port, the Hyperdrive connects directly to the Macintosh's central processing unit. An ingenious low-profile connector clamps over the CPU chip, giving the Hyperdrive 20 a high-speed data path directly into the Mac's circuitry. No external power switch is necessary, since the Hyperdrive connects directly to the Mac's internal power supply.

You have to go to an authorized Hyperdrive dealer for installation of the Hyperdrive disk, its controller board, power supply, and a small fan. It's definitely not a job for do-it-yourselfers, nor is the unit available uninstalled. Surprisingly, installation of a Hyperdrive does not void Apple's warranty on the Macintosh, which indicates that even Apple has a good deal of confidence in the quality of the Hyperdrive system. Once the disk is installed, a Hyperdrive-equipped Macintosh looks exactly like any other Mac, except for a sticker on the front panel and a 4½ pound weight increase.

Powering up the Hard Disk 20 is a two-step procedure. You must first activate the hard-disk unit and wait for it to stabilize—approximately 20 seconds—and then boot the Macintosh with a special start-up diskette in place. Once the hard disk has been activated, the start-up disk ejects, and you can do all of your work directly from the hard-disk drive. The only time that you need to use the floppy drive is for loading software onto the hard disk

DAVID BISHOP



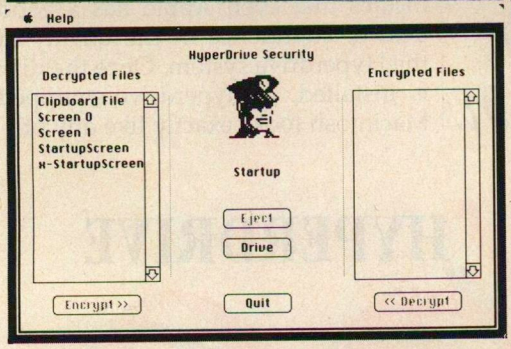
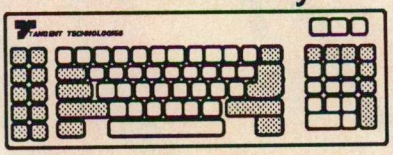


Figure 1 (top): The Hyperdrive's Drawers menu item lets you select drawers to be displayed on the desktop or hidden.

Figure 2 (above left): The Hyperdrive has a disk-backup routine that lets you put archival copies of your work on floppy disks.

Figure 3 (left): The Hyperdrive Security program lets you encrypt and decrypt your files.

PC MacKey



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or for starting applications such as Jazz and others whose copy-protection system requires a key diskette.

A Hyperdrive-equipped Mac also looks for a diskette in the floppy-disk drive when you first turn it on, but if it doesn't detect one, the Hyperdrive engages and loads the operating system directly. The Hyperdrive is the only self-starting Macintosh hard disk. This feature alone makes the Hyperdrive more convenient to operate than the Hard Disk 20. The machine is ready to use from a cold start in less than half the time the process takes with Apple's hard disk.

Both systems dramatically increase the speed of almost every task.

Both systems dramatically increase the speed of almost every task. Applications jump onto the screen in a fraction of the time they take from a floppy-disk drive, and disk-oriented commands such as file sorting and copying are significantly swifter. After you use either system, going back to a floppy-drive-only system seems like a trip into the Dark Ages.

Apple and General Computer take slightly different approaches to file organization, but both systems operate in a similar fashion overall. General chose to organize its disk into a series of "drawers," each of which acts much like a separate disk drive. A Drawers menu item lets you select which drawers you want to display on the desktop and which you want to hide (see figure 1).

The storage capacity of each drawer is dynamic; as you add more information, the drawer grows to the required size in 256K increments, with a maximum size of 16 megabytes per drawer. When you create a drawer, you can assign it a password. From that point on, no one can get access to the drawer and its contents without entering the password.

In Apple's system, the hard disk is treated as one large disk, with folders—or directories—dedicated to particular applications or users and smaller folders nested within these. Version 5 of the Finder, included with

the hard disk, provides an efficient way to work with this type of file organization (see "A Whole New Look" immediately following this article). The hierarchical system of grouping files into directories and subdirectories has been in use for years on other systems, but it was not until hard-disk storage became practical that it was needed in the Macintosh.

In addition to the new version of the Finder, the Macintosh Hard Disk 20 package also includes a font/desk-accessory mover for configuring System files and a hard-disk test routine. Apple recommends that you run the test routine once a month to ensure that the disk is operating properly.

The Hyperdrive's software selection is a bit more elaborate. In addition to the System software, General Computer includes a disk-backup routine that helps you make archival copies of your work on floppy disks for safekeeping (see figure 2). This routine lets you back up the entire contents of a specified drawer, specific files only, or just the files that have changed since the last backup.

Another software utility, the Hyperdrive Security program, adds sophisticated encryption and decryption and password protection to files, keeping them safe from prying eyes (see figure 3). A print spooler is also provided; it lets you print documents on the ImageWriter or other impact printer while performing other tasks. Since printing is often a time-consuming operation, the spooler can make quite a difference in your productivity. Apple's new finder and hierarchical file system work with the Hyperdrive, as well as with the Hard Disk 20.

Both the Hard Disk 20 and the Hyperdrive come with clearly written, well-illustrated manuals. The preliminary edition of Apple's documentation I received was good, and Hyperdrive's beautifully produced and in-depth manual is outstanding.

How Durable?

General Computer claims that a Hyperdrive 20 can withstand any physical shock that a standard Macintosh can endure, and during the review I was able to put that claim to the test. Because of shipping problems, my review unit was lost in transit for a few days, left to the mercy of several different carriers. When it finally arrived, the styrofoam supports in the box were completely crushed,

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and the Macintosh was bouncing around loosely within them.

The shock caused the loss of some data stored in the Hyperdrive, but there was no physical damage to either the Mac or the hard disk within. After I reformatted the hard disk and loaded the System software, it was as good as new. If the Hyperdrive can go through this kind of abuse and keep on ticking, it is certain to tolerate normal handling without a whimper.

Both the Hyperdrive 20 and the Macintosh Hard Disk 20 come with a 90-day warranty. Extended coverage is available for either unit, through the AppleCare program for the Hard Disk 20 and directly from General Computer for the Hyperdrive.

Apple's Hard Disk 20 has one very important advantage over General Computer's Hyperdrive: networking. The Hyperdrive makes no provision for sharing of its storage space. Apple's drive, on the other hand, was designed with multiuser operation in mind and is certain to be well supported by software developers. In addition, the Hard Disk 20's lower price, $1495 retail vs. $2195 for the Hyperdrive 20, makes it a far more affordable investment.

Choosing either machine will greatly enhance the performance of your Macintosh and help you do much more work in far less time.

If you use the Mac only as a personal workstation, then the single-package, self-booting convenience of the Hyperdrive 20 makes a lot of sense. Traveling with the Hyperdrive is certainly easier than going with a two-piece system, and its durability means that you can check it as baggage on airplanes without worry if you pack it properly. Owners of a 10-megabyte Hyperdrive can upgrade to a 20-megabyte system for $895. The system upgrade also entitles you to the new System software and utility programs.

Both the Macintosh Hard Disk 20 and the Hyperdrive 20 are high-quality products with merits of their own. The Apple's low price and multiuser capabilities will make it the choice for many, and the Hyperdrive's one-piece, self-starting, high-performance design and sophisticated software utilities make it well worth your consideration. Choosing either device will greatly enhance the performance of your Macintosh and help you do much more work in far less time. ✚

Chuck Doherty is an independent computer consultant and free-lance writer from South Dartmouth, Massachusetts. His work regularly appears in several computer and audio publications.

PRODUCT INFORMATION

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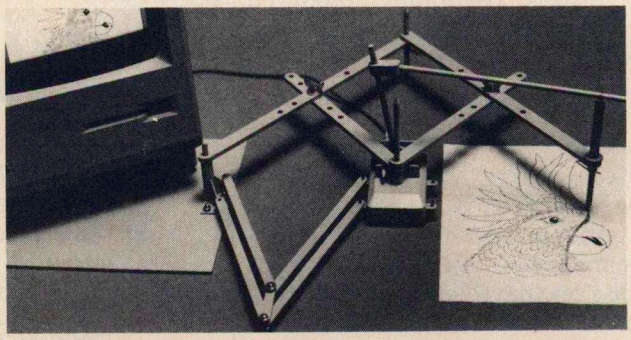

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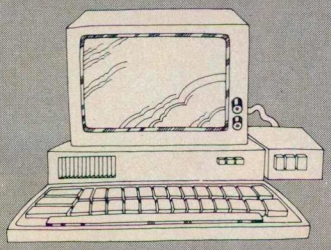

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A WHOLE NEW

The newest Macintosh System update provides new Open and Save As dialog boxes that let you take advantage of the Hard Disk 20's hierarchical filing system. In the new boxes, you work with folders just as you do on the Mac's desktop; a series of nested folders is what gives you the hierarchical structure. If you don't have a hard disk or if you have it but are accessing a floppy, the new-style dialog boxes will appear, but folders are ignored; only documents will appear in the window.

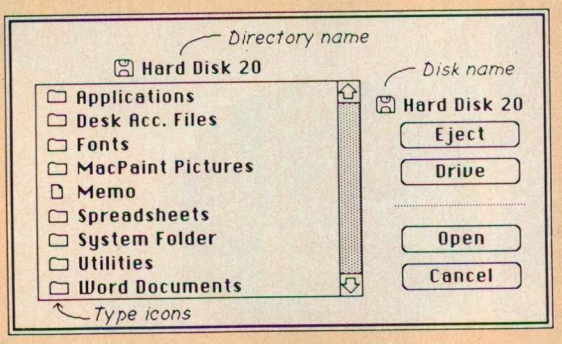

Figure 1: The basic Open box displays the directory name, which can be a disk or a folder; the disk name, which may sometimes also be the current directory name, as in this example; and all the items stored in the directory. Each item has an icon indicating its type: folder, application, or document. The document Memo here is not in any folder, so it appears in the disk directory.

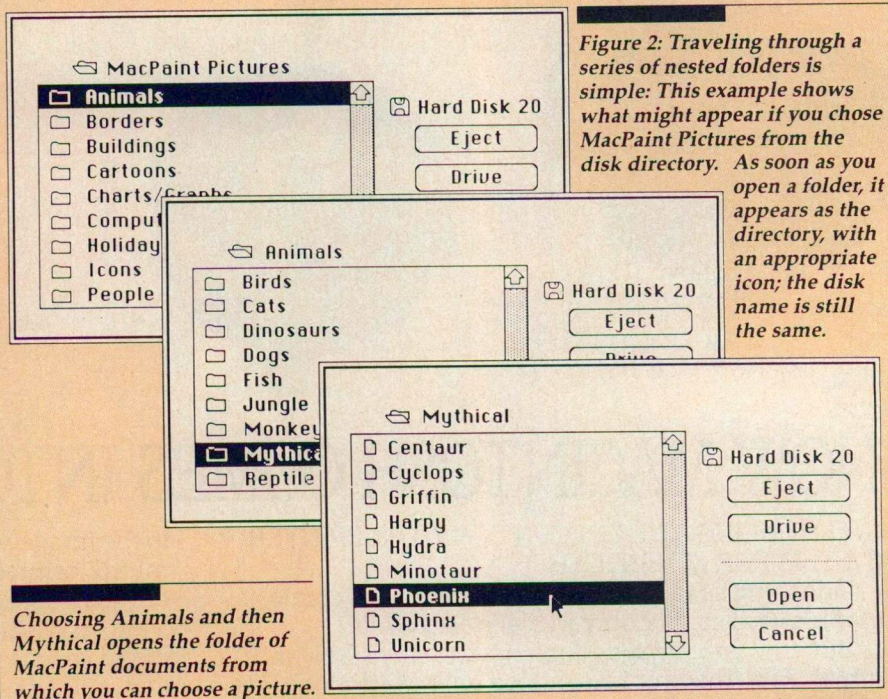

Figure 2: Traveling through a series of nested folders is simple: This example shows what might appear if you chose MacPaint Pictures from the disk directory. As soon as you open a folder, it appears as the directory, with an appropriate icon; the disk name is still the same.

Choosing Animals and then Mythical opens the folder of MacPaint documents from which you can choose a picture.

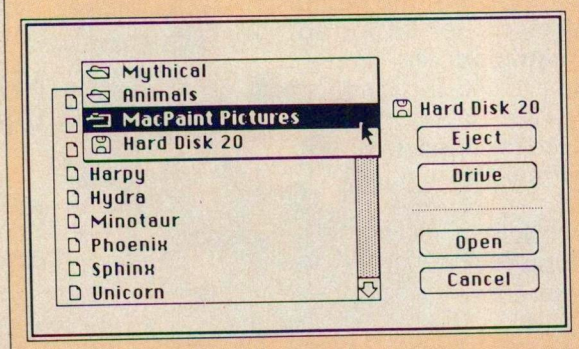

Figure 3: When you want to move backwards in your series of folders ("along the path," in hierarchical terms), all you have to do is click on the directory name; it has a pull-down menu that lists all the folders you have opened to get to the current directory. The folders are listed in order, with the initial directory last on the list. Selecting an item from the list makes it the current directory.

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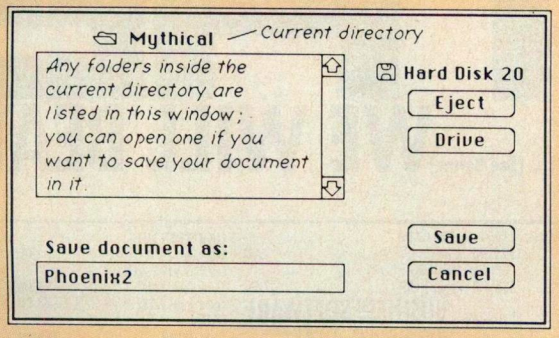


Figure 4: The new Save As box is similar to the Open box; the current directory is named above the scroll box. If you want the document saved in the named folder, just click on Save. If any folders are listed in the window, you can open one to store your document there.

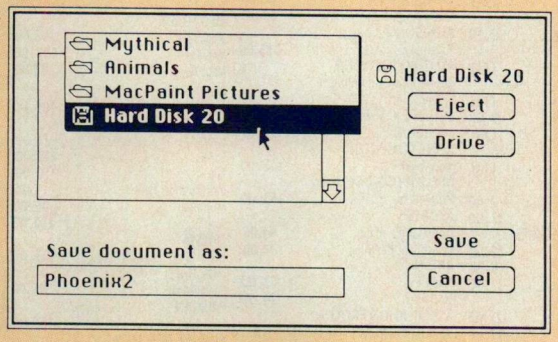
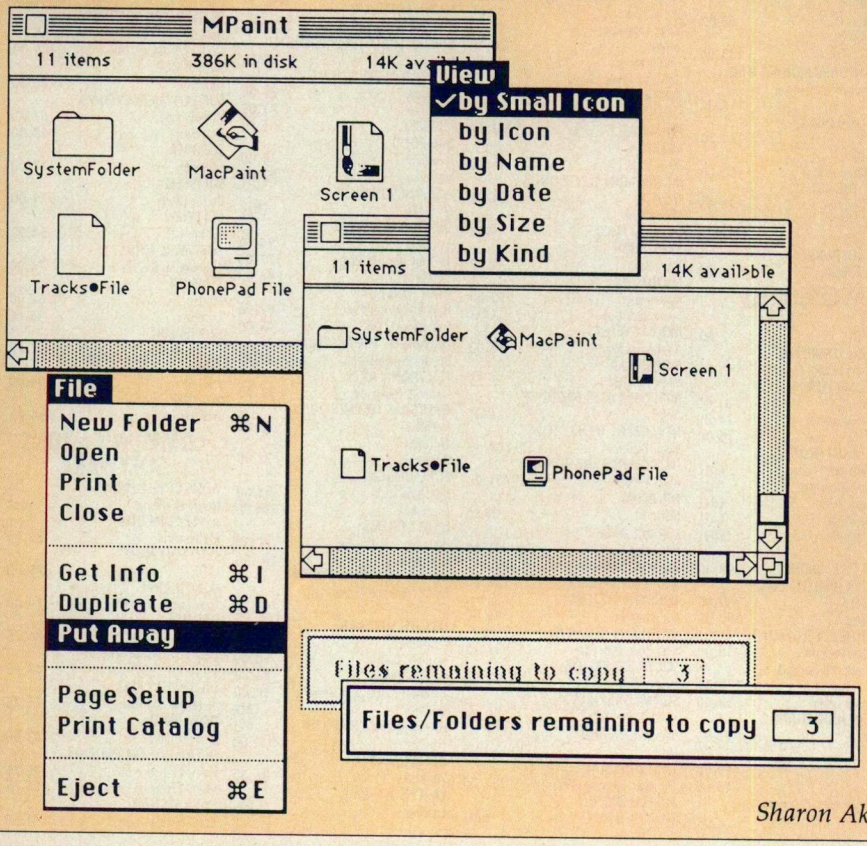


Figure 5: The directory name in the Save box also pulls down to a path list. If you want to save your document somewhere else in the path, you can select the desired directory from the menu. You can even follow another path through a different set of folders or go to the main directory—the disk—and store the document "loose," without any folder at all.

Figure 6: The new Finder (Version 5—we tested Version 5.0—) makes some changes to your desktop: It adds a Small Icon view option and gives you a Put Away option similar to the original Finder's Put Back—documents on the gray desktop or in the trash can are returned to their windows. The dialog box for file copies has been altered.



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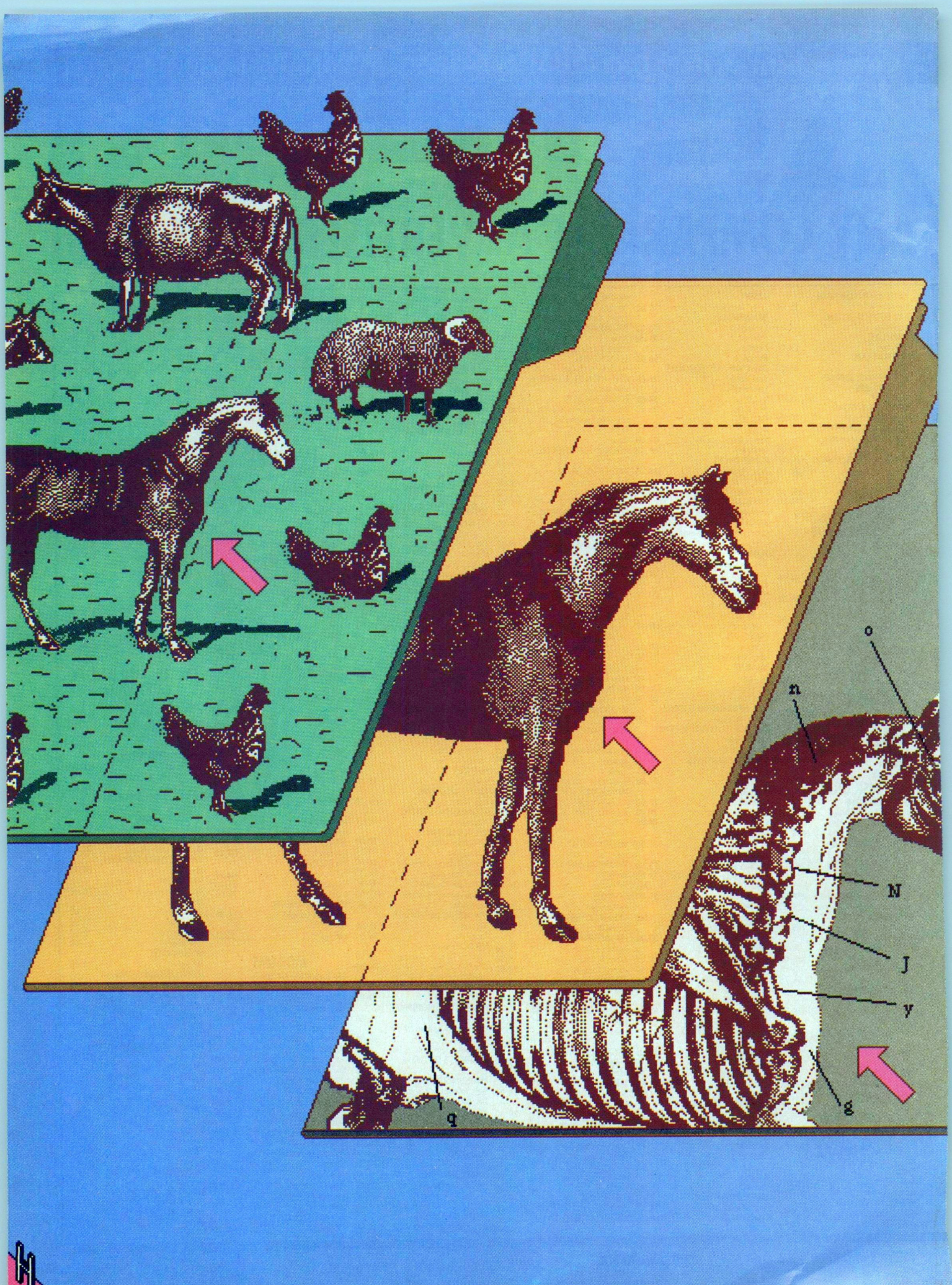
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An improved version of the milestone pictorial-database program for the Macintosh

Business Filevision

Business Filevision from Telos Software Products is a unique database-management application for the Macintosh. Choosing among database packages usually involves looking at the amount of information they can handle (the number of records per file and fields per record), how easily you can enter and manipulate your data, and what kinds of summary and printing capabilities are available. (For a detailed discussion on choosing a database program, see "The Electronic File Folder," *A+*, June and October 1985.) Business Filevision adds a new consideration, the graphic capabilities of the database program.

Why File by Picture?

Business Filevision is a substantially improved version of its predecessor, Filevision. It allows you to get information by opening a drawing and clicking on it to access a particular record. Imagine a map of the United States; you can click on a state or city and obtain a record of sales for that area. As Bob Foster, vice president of marketing at Telos, says, "We wanted to do something different that could really take advantage of the Macintosh and what it could do." And something different they have done. In addition to designing a unique application program, Telos encourages customers to use the product in unique ways.

Databases can be notoriously boring. Most of us are not excited by lists in any form. What we want is to be able to get at information as quickly and easily as possible. With the use of pictures, data becomes easier to access, more interesting, and easier to comprehend. Tom McDonald of Western Technologies, Inc., of Phoenix, Arizona, has rewritten a pavement-management program that used to run on an IBM, to work in a 512K Mac with Business Filevision. Drawings include areas of pavement (highways, parking lots, and the like). Records behind the pictures give information about existing pavement, amount of traffic, remedial work needed, and so on. McDonald estimates that having this information on a Mac costs about 10% of what it would cost on a mainframe.

Near Seattle, John Murphy, who is a consultant for the Hazardous Materials Response Group of the National Oceanic and Atmospheric Administration, is using Business Filevision to map spills of oil and hazardous materials in marine waters. When an oil spill occurs, samples from the surrounding area are mapped according to location, with information behind the map.

Technicians can click on the graphic representation and see the supporting information. They can see where samples were taken and highlight the ones that were positive or those that were taken on a given day, for example. These kinds of reports help in planning remedial action.

Murphy is also working on visual databases of ships, harbors, and hazardous-material dump sites. A graphic of a harbor shows what chemicals regularly pass through, local chemical facilities, and chemical storage sites. Data sheets for each chemical are in records linked to the graphics. Murphy has been demonstrating Business Filevision's capabilities to the Environmental Protection Agency and the Coast Guard.

Murphy is pleased not only with the capabilities of Business Filevision, but also with the Macintosh itself. "We sat people down in front of both IBM PCs and Macintoshes. With the Mac, we notice an almost immediate productivity increase; with an IBM, there's an almost immediate decrease." Having begun with the original Filevision, Murphy is pleased with the improved report capabilities and excellent file management of Business Filevision. Murphy owns Murphy Information Services in Edmonds, Washington.

With the use of pictures, data becomes more interesting and easier to comprehend.

If pavement management or emergency marine response is a bit beyond your business needs, consider Tony Stephen, who works at Bruto-

JOHN HERSEY

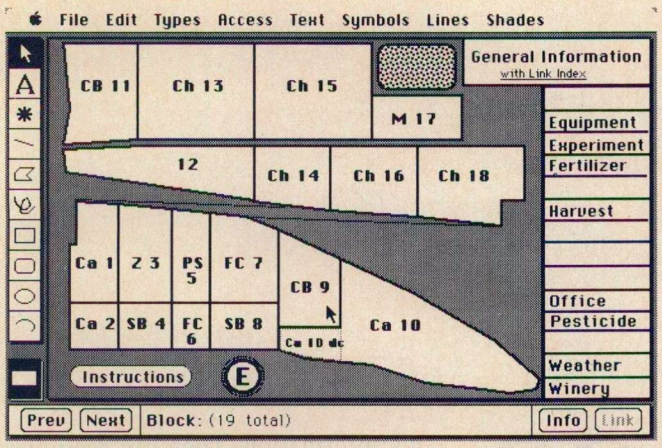

Figure 1: Blocks in the Brutocao vineyards. Clicking on a particular block provides information about that block. The list on the right shows related files you can open by clicking.

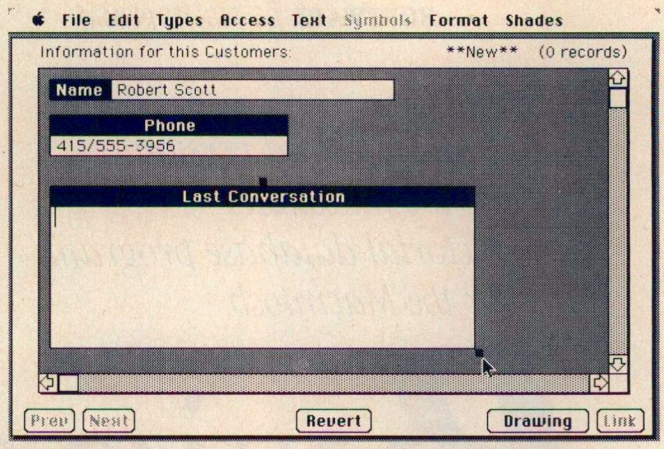

Figure 2: The handle on the top of the field lets you position it wherever you choose. The handle on the bottom right lets you adjust the size of the field.

cao Vineyard near Mendocino, California. What used to be a sheaf of file folders and 3 × 5 cards has turned into Business Filevision records. Stephen has these records for virtually every aspect of his business, including payroll, personnel, a future winery floorplan, and extensive vineyard files. A map of the vineyard shows areas broken down into blocks of 5–33 acres (see figure 1). Different files show fertilizer, pesticide, weather, and harvest information. With Business Filevision's computational capabilities, Stephen can calculate figures such as quantity per ton of grapes or pounds per vine under the different conditions of each block. By highlighting fertilizing history, he can hand his truck driver a map showing which blocks need to be fertilized next. Stephen estimates it took him 50 hours to create his files.

Working with Business Filevision

Business Filevision comes on two disks, a program disk and a system start-up disk; a 512K Mac is required, and you'll need a second disk drive. The program itself takes up 274K, and the Finder has been eliminated from that disk. The system start-up disk includes a complete system folder, a tour of Business Filevision, and a conversion program that allows you to upgrade Filevision files to Business Filevision. Disk space is at a premium, but the program instructions help you make the most of what you have. Although a hard-disk drive is not required, you may need one if you have a lot of data. The program disk is copy-protected, but you can transfer a limited number of copies to a hard disk in a way that does not require inserting the original floppy when you boot the program.

To create a file, you begin by giving that file a type, which is simply a category of information such as Clients or Inventory. You then design the layout of the information for the records in that type in a 30 × 30-inch area. To create a field, you click on the Add Field button, and a new field appears on the screen. You name the field, position it where you want it, and stretch it to be any size you want (see figure 2). Although the field name is limited to 31 characters, the field itself can contain up to 2000 characters. As many as 99 fields are permissible in each layout. The process is extremely easy, and you can change the layout any time you wish, even after you've entered the data into the fields. Once the design is complete, you can add the actual data.

Information in a field can consist of text, pictures, or numbers. Several options are available for automatic data entry, in addition to simply typing it in. You can set up an initial text field with a part of its information that remains the same for every record you type in—Terms or the current date, for example.

You can also have a field's contents copied from the previous record. Formula fields compute values based on the contents of one or more other fields. You can use other field names, arithmetic operators (+, −, ×, and ÷), numbers, parentheses, and the like to create your formula. Telos is working on an import/export feature that will let you enter data created with other programs (DIF, SYLK, and ASCII files) into Business Filevision. This feature will be available in the future for a nominal fee.

Although you can create files that do not use pictures, the ability to include visual representations as part of your database is what makes Business Filevision unusual. A major criticism of the original Filevision was that most of us are not artists, so creating unusual graphic displays was beyond our capabilities. Business Filevision has addressed this problem by allowing you to import graphics by using the Clipboard and Scrapbook. You can copy graphics from MacPaint or use images created with a digitizer.

In addition, Business Filevision provides a palette of drawing tools similar to those of MacPaint, as well as menus of shades and symbols, both of which you can easily edit for customized designs.

An unusual graphic feature is the pop-up (see figure 3). Clicking on a model townhouse instantly presents a floor plan of that model. You can create pop-ups by first drawing your graphics and then grouping them so that only one part is normally visible. Using pop-ups helps avoid an overly cluttered Macintosh screen.

Data Manipulation

When working with a database, you generally want to find specific information that you have stored. The Access menu contains commands to perform these functions. You can sort (put your records in order), find, rank, and highlight information according to criteria you specify.

Highlighting allows you to create a temporary subset of the selected type. The result is that the visual representations of the selected records are highlighted on the drawing display. A dialog box makes specifying your criteria relatively easy (see figure 4). You scroll through the fields; click on IS or IS NOT and the comparison operators; specify a certain value, a

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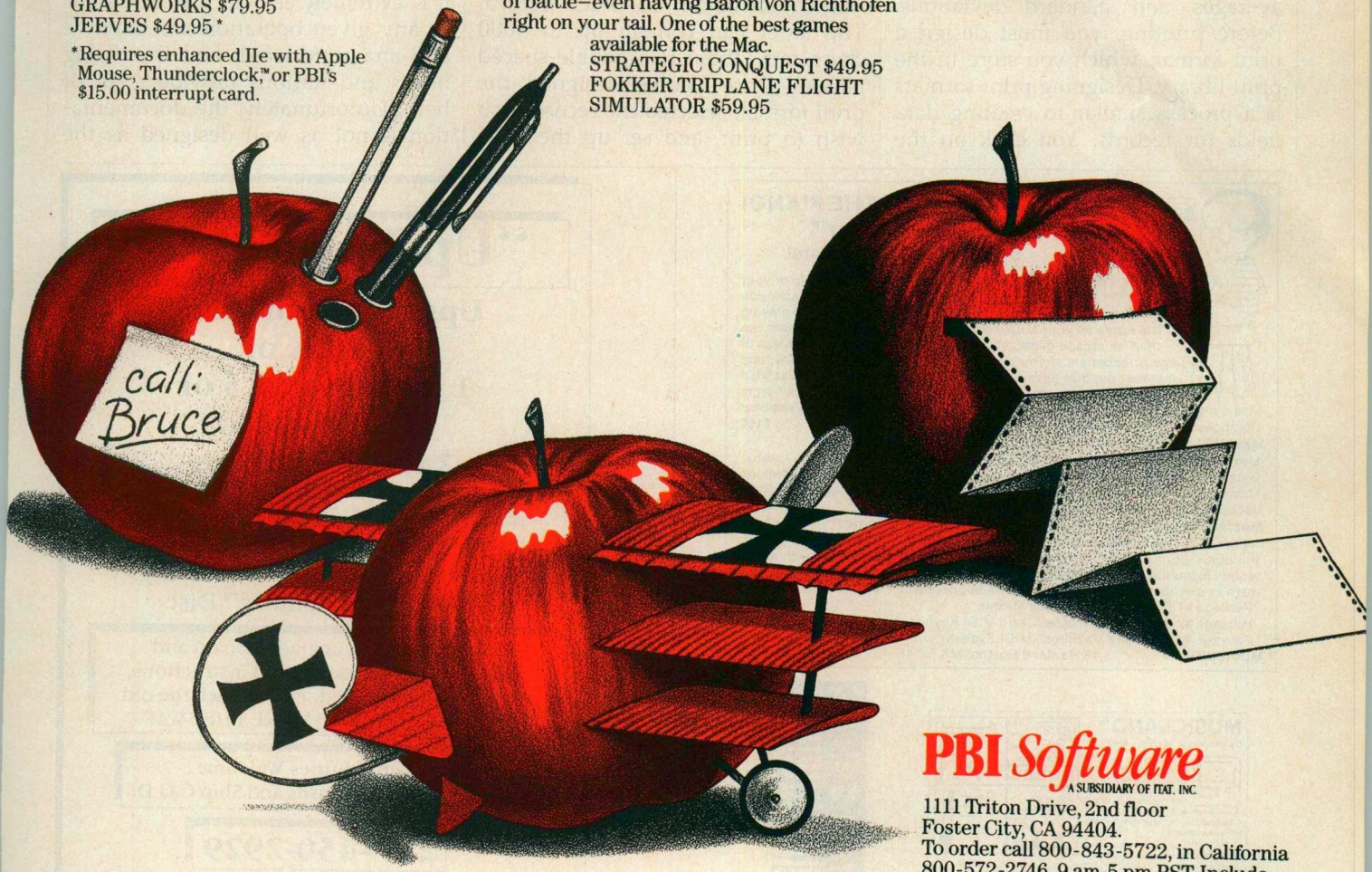

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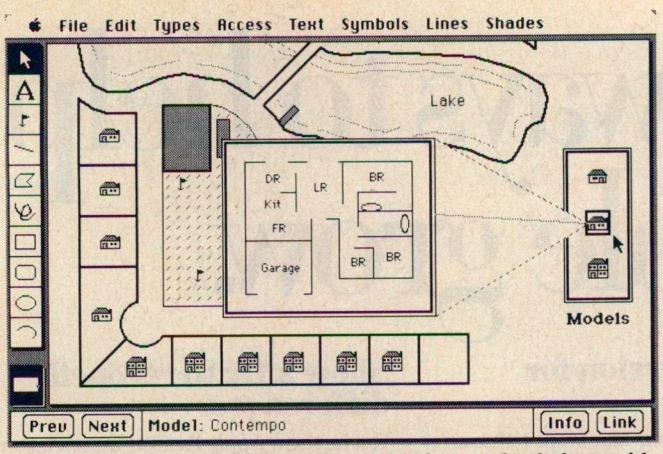


Figure 3: The pop-up is an unusual graphic feature that helps avoid an overly cluttered screen. Clicking on one of the townhouse models here reveals a pop-up of its floorplan.

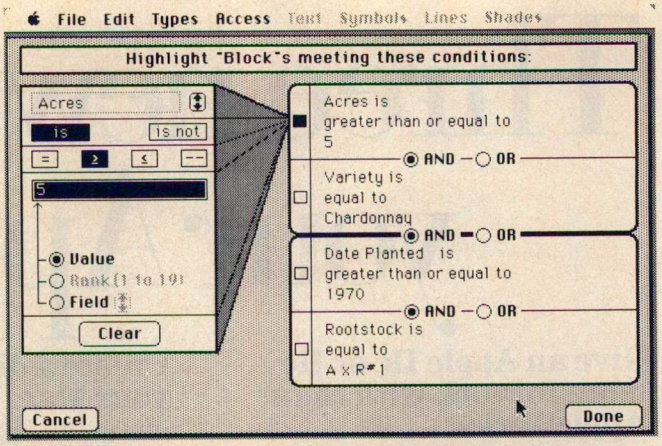
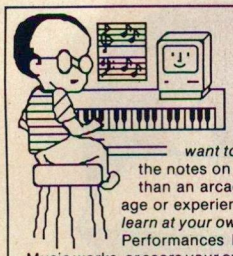


Figure 4: The specified conditions highlight five-acre blocks of Chardonnay planted after 1970 with specified rootstock. Resulting blocks will be highlighted on the block drawing in figure 1.

rank, or another field; and you're done. You can specify as many as four conditions for a single highlighting procedure.

Business Filevision allows you to print reports, forms, and labels. Reports are columnar and can contain summary information: counts, totals, averages, and standard deviations. Before printing, you must design a print format, which you store in the print library. Designing print formats is a process similar to creating data fields for records. You click on the Add Field button and scroll through to the field of your choice. You can print the field's name alone or only the information contained in the field. Different typestyles, sizes, and formats are available for each field. To create form letters, you add an "annotation field" that contains the same information for each record. The letter can contain up to 4000 characters (about two double-spaced pages). Once you've designed the print format, selected the records you wish to print, and set up the page size, you're ready to print. Unlike many other database programs, Business Filevision gives you the option of printing to the screen, so you can preview the results before they print out.

Although Business Filevision is designed to perform a variety of functions (drawing, filing, and reporting), it is extremely easy to use. The steps in any given operation are intuitive and straightforward, and the dialog boxes and buttons provide a lot of help. Unfortunately, the documentation is not as well designed as the



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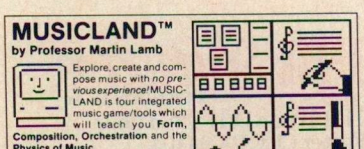

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software. The manual contains three major sections: "The Tour" provides explanations of the on-disk example that comes with the package, "Using Business Filevision" tells how to use each of the functions, and "Reference" contains reference information as well as directions for creating two sample files.

Going through "The Tour" provides a good introduction to how the program works, but you don't learn all of the basics, since the file has already been created. The author recommends that you read through the "Using Business Filevision" section, which is more than 130 pages long. I read for 15 minutes and gave up. I tried creating the sample files in the "Reference" section, but the information there did not contain step-by-step directions, so I was constantly flipping back to the second chapter.

Compared to the Others . . .

Given the quality of the software, the manual was extremely disappointing. The software contains help screens, which should alleviate some of the problem, though. I also called the toll-free customer-support number, and the support staff was quite helpful and patient in explaining how to do some things I later unearthed in the manual.

Business Filevision is not a relational database. You can't use information in one file in another file. If you have a name-and-address file, you won't be able to integrate, say, income-tax information from another file with that information. Although many users require the extra power of a relational database, you may not find it necessary. The Link feature allows you easily to open related files, but the information within each file remains separate.

How much information a database can deal with is an important criterion. Business Filevision files can be as large as four megabytes, each file can hold up to 32,000 records, and each record can contain up to 99 different fields. The ability to create graphics is unique to this program.

Telos is actively facilitating the exchange of templates and designs among Business Filevision users. More than a hundred public-domain programs were available at the time of this writing, pertaining to archaeological digs, astrology, maps, genealogy, and much more. These programs are available from Telos for $1.50 each plus a $3 charge per diskette. More-complex packages are available from individual vendors. Information about templates, tips on using Business Filevision, and a subscription to *Filevision* magazine go to all registered purchasers. Given Telos' responsiveness to customers, I'd expect future upgrades and changes to be quite exciting. If you're looking for new and interesting ways to organize and present data, Business Filevision is for you. ✚

Sue Crissman is a San Francisco Bay Area writer, consultant, and contributing editor to A+. Her clients include Apple and other computer companies for which she designs and writes training, sales, and promotional materials.

PRODUCT INFORMATION

Business Filevision
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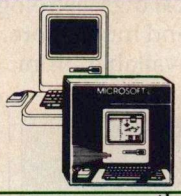

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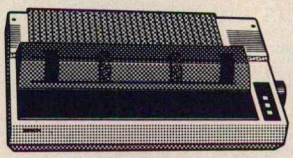

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Microtek *Magnum 80me 80COL + 64K*	93.00*	*(2.50)*
Orange Micro *Grappler +*	96.00*	*(2.50)*
Orange Micro *Serial Grappler*	66.00*	*(2.50)*
PC Network *Z80 Card*	35.00*	*(2.50)*
Quadram *Multicore-1/Parallel/1 Serial/Clock/ Expandable to 256K*	140.00*	*(2.50)*
Quadram *MP-8K Microfazer Buffer (expandable)*	110.00*	*(2.50)*
Quadram *APICIG Graphics Interface*	62.00*	*(2.50)*
Quadram *eRAM-80 80COL with 64K Memory*	88.00*	*(2.50)*
Street Electronics *ECHO II Speech Synthesizer*	85.00*	*(2.50)*
Thunderware *Thunderclock*	104.00*	*(2.50)*

PRINTERS

Apple *15" Imagewriter (with Mac Kit)*	$ 485.00*	*(10.48)*
Apple *8.5" Imagewriter (with Mac Kit)*	446.00*	*(9.34)*
Apple *Laserwriter*	4,895.00*	*(75.00)*
▶ **Citizen** *MSP-10 160CPS/80COL*	265.00*	*(5.72)*
▶ **Citizen** *MSP-15 160CPS/132COL*	350.00*	*(7.56)*
Citizen *Premiere 35 35 CPS Daisewheel/132 Col/Fric + Trac*	385.00*	*(8.32)*
▶ **Epson** *LX-80 100CPS 80COL LQ Mode*	199.00*	*(4.30)*
▶ **Epson** *FX-85 160CPS 80COL*	299.00*	*(6.46)*
▶ **Epson** *FX-185 160CPS Wide Platen*	429.00*	*(9.27)*
▶ **Epson** *LQ-1500 NEW LQ/DP Printer*	799.00*	*(17.26)*
Epson *SQ-2000 NEW! Inkjet Printer 106CPS LQ Model/176CPS Draft/132COL*	1,359.00*	*(29.35)*
Epson *DX-35 NEW! Daisewheel Printer 35CPS/132COL/True Letter Quality*	569.00*	*(12.29)*
NEC *2030 20CPS Letter Quality Printer*	605.00*	*(13.00)*
NEC *3530 33CPS Letter Quality Printer*	888.00*	*(19.18)*
NEC *8810 55CPS Printer*	1,275.00*	*(27.54)*
▶ **Okidata** *ML 182 New 120CPS/LQ Mode/FRIC/T*	CALL	
▶ **Okidata** *Color 20 80CPS/100+ Colors/ LQ Mode/Epson Graphics/+ More (Requires Interface)*	CALL	
▶ **Okidata** *ML 192 New Sleek Design/160CPS/ LQ Mode/Fric/IBM Graphics*	CALL	
Quadram *Quadjet Multicolor Ink-Jet with Kit*	398.00*	*(8.55)*
Texas Instruments *855 DP/LQ w/Tractor*	679.00*	*(14.70)*
Toshiba *P1340 80COL/144CPS*	450.00*	*(9.72)*
Toshiba *P351 New! 132COL/288CPS*	975.00*	*(21.06)*

ACCESSORIES AND SUPPLIES

Apple *Macintosh Carrying Case*	$69.00*	*(1.49)*
▶ **Assimilation Process** *Mac+Turbo+Touch*	73.50*	*(2.50)*
▶ **Brand Name Macintosh Diskettes** *Box of 10 Guaranteed for Life Includes Free Flip & File Case*	15.95*	*(1.00)*
▶ **Brand Name SS/DD Diskettes** *(Box of 10)*	7.95*	*(1.00)*
Chalkboard *Powerpad*	82.00*	*(1.50)*
Hayes *Mach II Joystick for IIe*	25.00*	*(1.50)*
Hayes *Mach III Joystick w/Fire Button for IIe*	31.00*	*(1.50)*
Kensington Microwave *System Saver Fan*	56.97*	*(1.50)*
Koala *KoalaPad Touch Tablet*	78.00*	*(1.50)*
M & R *Sup-R-Mod RF Modulator*	44.00*	*(1.50)*
PC Network *Cooling Fan with Surge Protector & Dual Outlets*	25.00*	*(2.50)*
Sony *Mac Diskettes (Box of 10)*	19.00*	*(1.00)*
Thunderware *Thunderscan Optical Digitizer No Expensive Camera Equipment Needed!!*	155.00*	*(2.50)*
WP Printer Paper *2600 Sheets Microfine Perfs*	17.00*	*(10.00)*

Mac-Too! Indicates the Mac version is available at the same price.

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Pipeline

NEW BROTHER PRINTERS

Brother International has introduced three new printers—the Twinriter 5, the M-1509, and the 2024L.

The Twinriter 5 combines true letter-quality, daisy-wheel and dot-matrix print mechanisms so that users can produce graphics and letter-quality text easily in the same document. Users can switch between the two printheads either by pushing a button or by using software commands.

The M-1509 is a quiet, 136-column, dot-matrix printer that can produce draft and near-letter-quality print at speeds of 180 characters per second (cps) and 45 cps, respectively.

The 2024L dot-matrix printer has a staggered 24-pin printhead that allows it to produce letter-quality print at speeds of up to 96 cps and drafts at 160 cps.

(List Price: Twinriter 5, $1295; M-1509, $499; 2024L, $1295)

Brother International Corporation
8 Corporate Place
Piscataway, NJ 08854
(201) 981-0300

CIRCLE READER SERVICE NO. **502**

MAC

TIMEWAND BAR-CODE READER

Designed for professional applications in offices or industrial work areas, TimeWand is a compact bar-code reader—about the size of a credit card—that has a built-in clock. The card has a rechargeable battery that can power it for 72 hours, and its 16K RAM can store 1750 bar-code scans. When users pass the card over a bar code, it stores the code and the precise time of the pass.

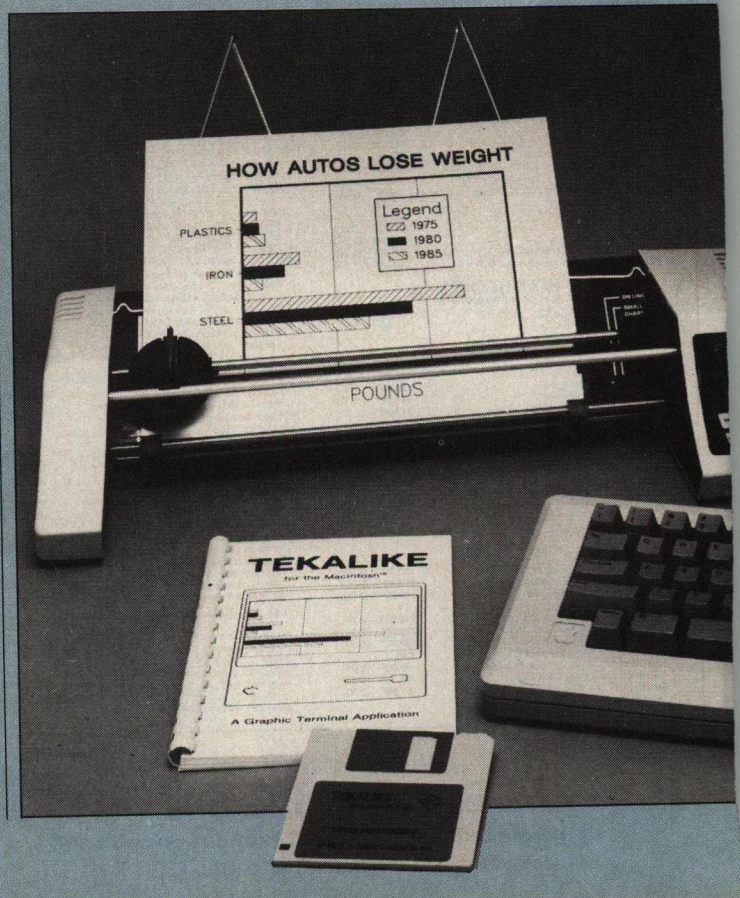
At the end of the day, users can insert the card into the recharger, which transfers the stored information as a standard ASCII text file, through an RS-232 connector, to a computer.

Also available for use with TimeWand is TimeWand Manager, a powerful database program for the Macintosh. This program automatically matches each bar code with a specific name or title and uses time lines to give a graphic representation of each day's activity. The program can also search, sort, and use formulas, and because it uses standard file formats, the data is compatible with many other business programs. Other features of the program enable users to customize the bar-code reader and to use a modem to download data

TimeWand is a portable bar-code reader that has a built-in clock.

The enhanced version of Tekalike (below) turns the Macintosh into a professional graphics workstation.

The 2024L dot-matrix printer from Brothers International Corporation



from remote locations. *(List Price: TimeWand 2K version, $198; 8K version, $228; 16K version, $248; TimeWand Manager, $499; Macintosh starter kit [2K wand, single-unit recharger, TimeWand Manager,] $799)*

Requires: Macintosh

Videx
1105 N.E. Circle Blvd.
Corvallis, OR 97330
(503) 758-0521

CIRCLE READER SERVICE NO. **500**

MAC

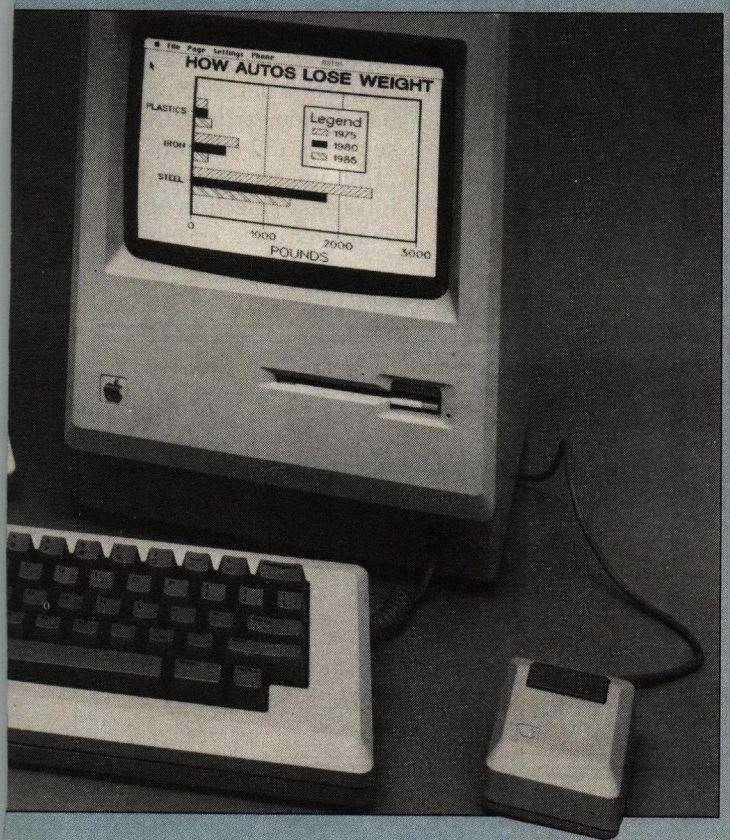
ENHANCED VERSION OF TEKALIKE

Mesa Graphics has introduced an enhanced version of its graphics-communications program Tekalike. The enhancements turn the Macintosh into a professional graphics workstation for use with a mainframe screen Editor. Tekalike now supports the LaserWriter, has improved ImageWriter output, and also supports the DMP51 and DMP52 C/D size plotters from Houston Instruments. Users can save mainframe graphics as MacDraw documents and edit them without loss of resolution and can generate MacPaint documents from mainframe graphics. In addition, Tekalike users can now use screen editors that use the ANSI X3.64 command set, the graphic cursor commands and selective erasure of the VT640, and the color and panel commands of the Tektronix 4105. *(List Price: $250)*

Requires: Macintosh

Mesa Graphics
P.O. Box 600
Los Alamos, NM 87544
(505) 672-1998

CIRCLE READER SERVICE NO. **514**



II SERIES MAC

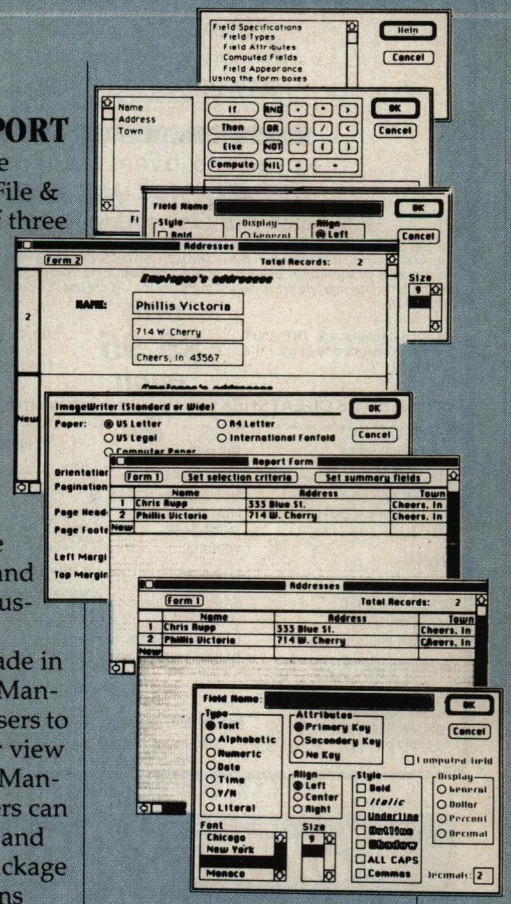
RGS FILE & REPORT

Rio Grande Software (RGS) has released File & Report, a package of three data-management programs that enable users to store and retrieve data quickly and to produce reports, lists, and summaries. The package contains File Manager, which allows users to design file layout, store and access records, and compute new fields using values obtained from calculations made in other fields; Record Manager, which allows users to add, change, find, or view records; and Report Manager, with which users can design, set up, save, and print reports. The package is available in versions that take advantage of special features of particular computers. *(List Price: $89.95)*

Requires: Apple IIe, IIc, or Macintosh

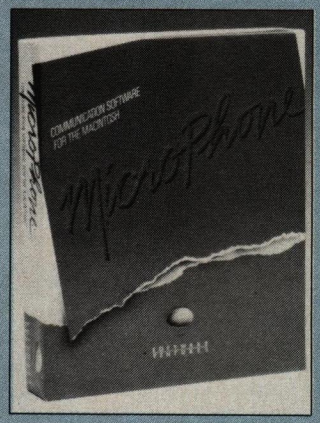
Rio Grande Software, Inc.
221 Nolana
P.O. Box 5906
McAllen, TX 78504
(800) 527-1121
in TX (800) 292-1031

CIRCLE READER SERVICE NO. **512**



Sample screens from RGS File & Report

The MicroPhone is designed for both experienced and novice communicators.



MAC

MICROPHONE

Software Ventures Corporation has announced the release of MicroPhone, the first telecommunications program to utilize the full power of the Macintosh. It was designed for both experienced and novice communicators by Dennis Brothers, the author of the first Macintosh communications program, MacTEP.

MicroPhone automates the entire telecommunications process by using macros. You can build a macro by activating the Watch Me mode, in which the program automatically records a complete session, remembering any se-

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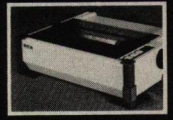

Call or write for additional information:
DOSS INDUSTRIES
1224 Mariposa, San Francisco, CA 94107
(415) 861-2223

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Pipeline

ries of MicroPhone keyboard commands and system prompts. The entire sequence is saved, and you can later invoke it at any time with a single keystroke.

Another way to generate macros is through MicroPhone's Script window, which displays an extensive set of functions that can be linked to form macros. Those features allow users to automate activities such as log-on, file transfer, and unattended operation.

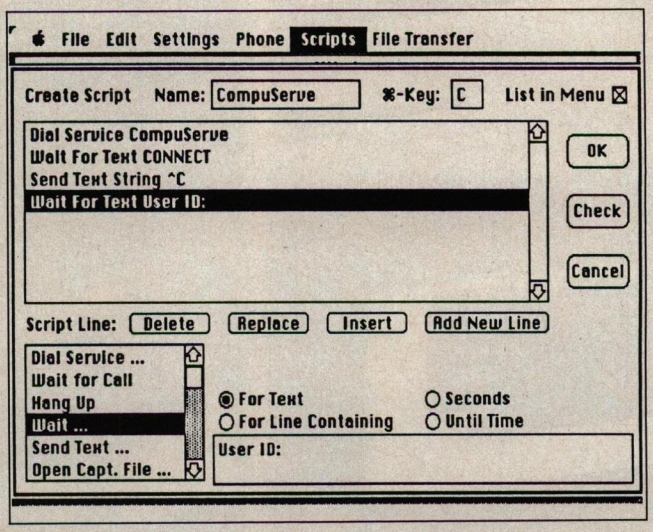
MicroPhone also provides a Start-Up mode, in which the entire session from log-on to sign-off is conducted without any user intervention—the session commences as soon as the MicroPhone disk is inserted.

MicroPhone has the most complete file-transfer capability available, letting users send and receive anything—spreadsheets, charts, artwork—that can be created on a Macintosh.

MicroPhone emulates DEC, VT-100, VT-52, and TTY-type terminals and supports text (ASCII) and XMODEM (Christensen) protocols. It is also LaserWriter-compatible and includes Switcher for use with other programs. It can be used with Hayes, Apple, and other leading modems. *(List Price: $74.95)*

Requires: Macintosh, modem

Software Ventures Corporation
2907 Claremont Avenue
Suite 220
Berkeley, CA 94705
(415) 644-3232
CIRCLE READER SERVICE NO. **570**

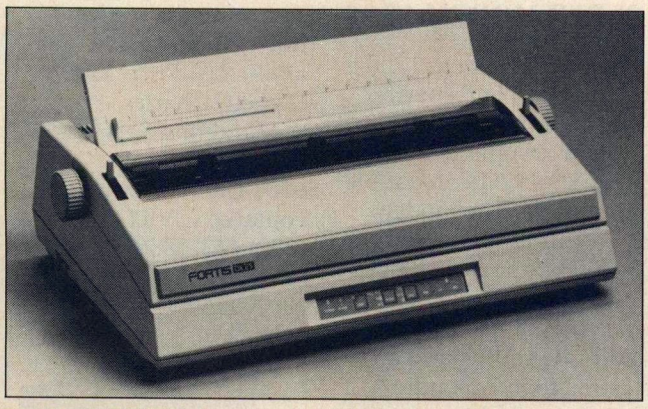


MicroPhone's Script window

HARDWARE

DX25 DAISY-WHEEL-PRINTER

The newest addition to the Dynax product line, the Fortis DX25 is a quiet, rugged daisy-wheel printer that has both a parallel and a serial interface. The printer can print at 25 characters per second and has a wide carriage that supports 132 columns of print. Its front panel allows easy selection of character pitch and line



The Fortis DX25 daisy-wheel printer

spacing; a copy function; and Top of Form, Line Feed, and Select functions. The unit has a paper supporter for use with single-sheet feeding; an optional bidirectional tractor feeder and single-bin sheet feeder are also available. Its multistrike ribbon has a life expectancy of more than a million characters. *(List Price: DX25, $645; tractor feeder, $149.95; sheet feeder, $299.95)*
Dynax, Inc.
6070 Rickenbacker Road
Commerce, CA 90040
(213) 727-1227
CIRCLE READER SERVICE NO. **503**

II SERIES

DVORAK/QWERTY KEYBOARD SWITCH

Faultline Micro has introduced a Dvorak/QWERTY Keyboard Switch (DQS) that provides Apple IIe users with a dual-purpose keyboard. The switch is easy to install, mounting on the back of the computer, and is transparent to all software. The product replaces the Apple IIe's keyboard ROM with one that matches the IIc in function.

It comes with a set of keycap overlays that display both the Dvorak and QWERTY keyboard arrangements, although the larger lettering is Dvorak. Users can use either keyboard by flipping the switch. *(List Price: $39.95)*
Requires: Apple IIe
Faultline Micro
P.O. Box 3147
Fullerton, CA 92634
(714) 526-5055
CIRCLE READER SERVICE NO. **505**

II SERIES MAC

EPSON AP-80

Featuring hardware plug compatibility and full software compatibility with the ImageWriter printer, Epson's new 80-column dot-matrix printer, the AP-80, can produce high-resolution graphics and draft- and correspondence-quality output. The AP-80 prints drafts at 75 characters per second (cps) and near-letter-quality output

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MC/VS 1-800-543-1040

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The Epson AP-80 dot-matrix printer is fully compatible with ImageWriter software for the Apple IIe, IIc, and Mac.

at 15 cps. Users can select near-letter-quality output, and software control offers italic, bold, double-width, proportional, subscript, and superscript typestyles. The printer comes with both friction and adjustable tractor feeds and has an automatic single-sheet-load feature. *(List Price: $379)*

Requires: Apple IIe, IIc, or Macintosh

Epson America, Inc.
2780 Lomita Blvd.
Torrance, CA 90505
(800) 421-5426
in CA (213) 539-9140

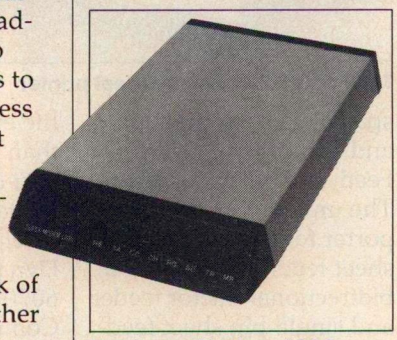
CIRCLE READER SERVICE NO. **501**

SUPER MODEM 1200

The Super Modem 1200 is a complete, high-performance communication system designed for use with RS-232C-compatible computers. The modem performs at speeds of both 0–300 bps and 1200 bps, automatically determining the computer's transmission-rate setting and adjusting to it. An audio monitor enables users to listen to a call's progress and alerts them about wrong numbers and busy signals. LED status indicators on the modem's front panel provide a visual check of operational status. Other features include auto-dial/redial, touch-tone and pulse dialing, and full- or half-duplex operation. *(List Price: $299)*

Everett/Charles Marketing Services, Inc.
6101 Cherry Avenue
Fontana, CA 92335
(800) 443-1860
in CA (800) 821-0589

CIRCLE READER SERVICE NO. **504**



The Super Modem 1200 operates at 300 or 1200 bps.

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- Word count 10 per second
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...I am impressed by Spellworks, not only because of the errors it detects, but also for the number of errors which it does not detect. By this I mean that it has a powerful vocabulary, and it recognizes a large number of variations of words so that it does not incorrectly call errors. The program is easy to use. I didn't even have to use the manual which came with the program. Good job and keep up the good work — *Manager, Electrical Engineering Kenneth McCuen, Solitec, Inc., Santa Clara, CA*

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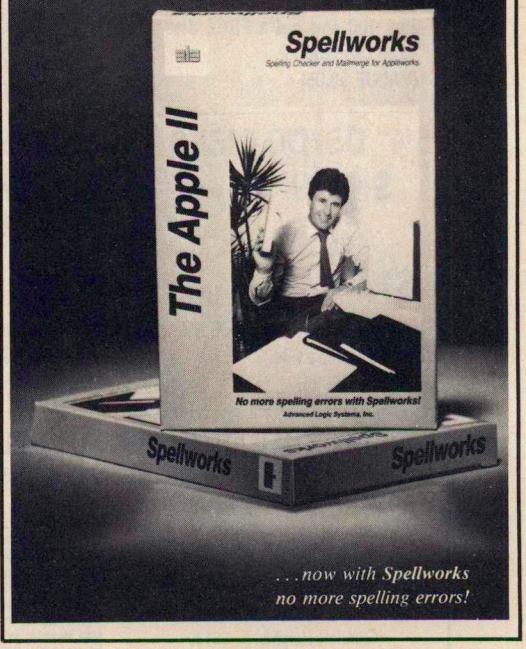

Advanced Logic Systems, Inc.

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HARD/SOFTWARE

II SERIES

COMPUTEREYES

The Apple IIc version of Digital Vision's video digitizers for Apple computers, Computereyes, is a slow-scan device that plugs into the computer's serial port 2 and joystick ports and connects easily to any standard video source. Under simple software control, the system acquires black-and-white images in less than six seconds. Its multiscan modes also provide realistic gray-scale images. The system comes with a comprehensive software package that includes machine-language image-capture routines; a menu-driven Executive program for first-time users, and the ability to save images to disk.

Computereyes is available as a basic package that includes the interface module, software, and manual or as a complete system that also includes a high-quality video camera. Optional software enhancements that support acquisition of double-high-resolution images and that work with specific graphics programs are also available. *(List Price: Computereyes, $129.95; Computereyes Camera System, $399.95; software packages, $15 each)*

Requires: Apple IIc

Digital Vision, Inc.
14 Oak Street
Suite 2
Needham, MA 02192
(617) 444-9040

CIRCLE READER SERVICE NO. **506**

SOFTWARE

II SERIES

THE DATA REPORTER

The Data Reporter is information-management software for use on Apple-II-series computers. Users can create new data formats, enter information into files, and print reports by selecting options from a series of menus, without having to memorize complex command sequences.

The program lets you place up to ten calculated fields within any record, and it can calculate subtotals and grand totals from any numeric field. It sorts 300 records in less than

The basic Computereyes system for the Apple IIc comprises an interface module, software, and a manual.

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five seconds and searches 300 records in less than one second. Database searches can be for full or partial matches or can be to find data within specified ranges.

The Data Reporter's Global Editing, Block Delete, Merge, and Append functions let you manipulate files easily.

You can reformat data without reentering information, including making changes to the number of fields in a record and length of fields. The program offers password protection, and its way of using random-access memory allows quick entry and updating of record without delays for disk access. *(List Price: $199)*

Requires: Apple II, II Plus, IIe, or IIc; 48K RAM; one disk drive; DOS 3.3

SoftWest Programming
4418 East Chapman
Suite 156
Orange, CA 92669
(714) 380-9437

CIRCLE READER SERVICE NO. **571**

II SERIES

MUSICPRINTER PROGRAM FOR THE APPLE II

Musicprinter is a music-printing program that enables users to create and edit scores on-screen and then print them. The program works like a word-processing program, with easy single-keystroke insertion and deletion of characters, margin justification, and editing. It automatically places beams, stem extensions, and ledger lines correctly as users enter notes and can automatically transpose an entire score or individual lines.

Three print styles are available—Normal, Emphasized, and Compressed—with an optional reverse image in each style, and users can also intermix music with upper- and lowercase text. *(List Price: $149)*

Requires: Apple II Plus, IIe, or IIc; 48K RAM; one disk drive; printer

JRM Publications Ltd.
P.O. Box 4913
Richmond, VA 23220-8913
(804) 288-0862

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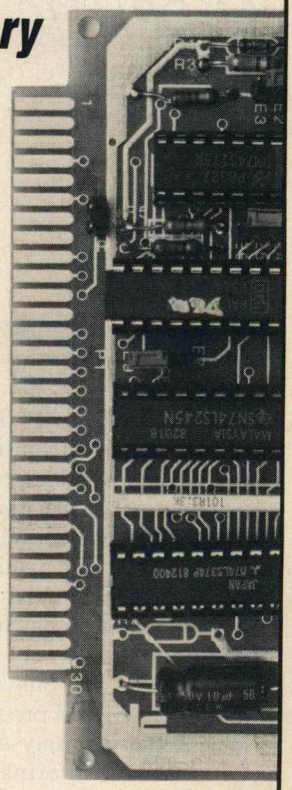
80 column screen	$179	SMARTERM II™	Apple II, II Plus, IIe®

*can be upgraded to 256K



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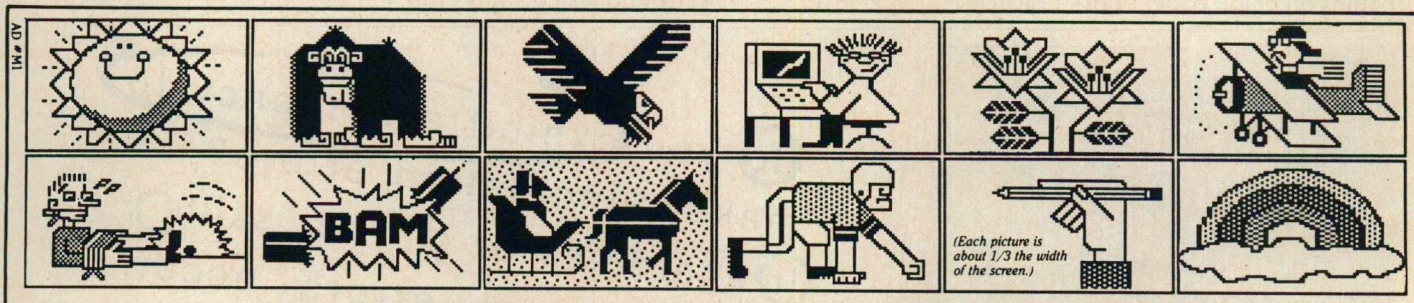
CIRCLE 122 ON READER SERVICE CARD



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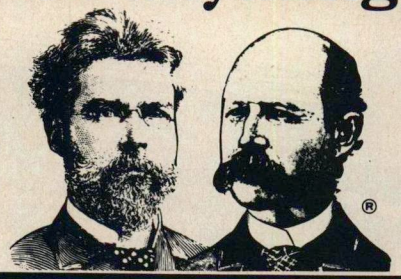

Beagle Bros MICRO SOFTWARE

3990 Old Town Avenue, San Diego, California 92110

Minipix works on any Apple II+, IIe or IIc; DOS 3.3 *and* ProDOS.

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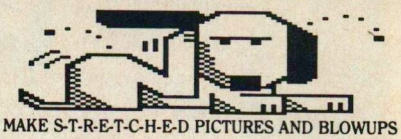

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$29.95 Friendly and unprotected Minipix is "unlocked" and compatible with all Apple II's. Like all Beagle disks, you can make backups without hassle or special software.

Apple, ProDOS and MousePaint are trademarks of Apple Computer, Inc.

CIRCLE 148 ON READER SERVICE CARD

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MAC

MACINTAX INCOME-TAX PROGRAM

Designed for Macintosh computers, the income-tax program MacInTax displays exact IRS forms on-screen and has the entire IRS instruction booklet on-line. Worksheet/itemization windows contain all the worksheets available in the IRS booklet. The program also has full editing functions, performs tax calculations automatically, and provides "what if" analyses. Users can save information and print any combination of forms, schedules, and itemizations on blank paper or directly on IRS forms.

Several MacInTax packages are available. MacInTax Federal contains the MacInTax program and forms for producing federal returns. For use with MacInTax Federal are MacInTax Business Supplement, which contains additional forms and schedules, and MacInTax State Supplements, which contains forms for producing state returns. Yearly updates that include all changes to tax laws, and new forms and schedules are also available. *(List Price: MacInTax Federal, $75; Business Supplement, $30; State Supplements, $30 each; Federal update, $30; Supplement update, $15 each)*

Requires: Macintosh
Softview, Inc.
315 Arneill Road
Suite 215
Camarillo, CA 93010
(800) MACNTAX
in CA (800) MACVIEW

CIRCLE READER SERVICE NO. **509**

II SERIES

TAXPAK-86 PROGRAM FOR THE APPLE II

An interactive tax-preparation program designed for home use, Taxpak-86 guides users through the preparation of their 1985 IRS Form 1040 and Schedules A, B, C, D, G, SE, and W. The program performs all subtotaling and tax computations automatically and also displays the current tax liability and the impact of the most recently entered transaction on the bottom line of the display screen. This "instant bottom line" enables users to perform "what if" simulations and explore alternative tax strategies. When users have completed their returns, they can print them on plain paper and use the supplied transparencies to photocopy them for submission to the IRS. *(List Price: $39.95)*

Requires: Apple II, IIe, or IIc; 64K RAM; one disk drive
Ahware
805 Luz Court
Danville, CA 94526
(415) 837-7346

CIRCLE READER SERVICE NO. **511**

SENSIBLE GRAMMAR™

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†Note: CP/M, Pascal and PFS: WRITE versions do not suggest correct spelling of words or allow immediate correction of misspellings.

Sensible Grammar™ is available for $99.95; **Sensible Speller™** for $125.00 in either the "IV" or ProDOS version; **Sensible Technical Dictionary™** for $59.95; **Stedman's Medical Dictionary™** for $99.95; and **Black's Law Dictionary™** for $99.95. The three specialized dictionaries require the **Sensible Speller.** All programs are available separately and run on Apple® computers.

Sensible® Software, Inc.

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GUITAR MASTER

Guitar Master is a self-paced tutorial that teaches 396 of the most useful chords on the fingerboard. The package includes a program for tuning the guitar, a chord analyzer, 375 progressions, 18 picking and strumming patterns, all major scales, plus a guide to transposing and notes on the frets. The manual includes lessons for every skill level. *(List Price: $49.95)*
Requires: Apple II, II Plus, or IIe; Mockingboard
MasterSoft
P.O. Box 1027
Bend, OR 97709
(503) 388-7654

CIRCLE READER SERVICE NO. **546**

CONDUIT SOFTWARE

CONDUIT, the educational-software publisher at the University of Iowa, has released four new educational-software packages for Apples.

DASHER Drills for Deutsch heute and Prego! are drill-and-practice packages for the German and Italian languages. Each package includes more than 250 lessons that span a normal first-year course in the language.

START: Stimulus and Response Tools for Experiments in Memory, Learning, Cognition, and Perception is a set of 15 programs that provides students with hands-on experience in designing and conducting psychological research. The package involves students in more creative problem solving than the typical laboratory package does. START is appropriate for a lower-division laboratory course in experimental psychology. The START programs can also be used in such undergraduate psychology courses as learning, perception, and social psychology.

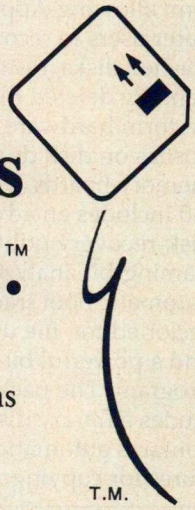
CATGEN allows students to mate domestic cats of known genotypes. Students can conduct genetic investigations over several generations without the time delays that normally constrain laboratory experiments. *(List Price: Deutsch heute, $150 for Module 1, $100 for Module 2, $200 for both; Prego!, $150 per module, $360 for three; START, $150; CATGEN, $75; Animation Demonstration, $25)*
Requires: Apple II Plus, IIe, or IIc; 48K RAM

CONDUIT
The University of Iowa
Oakdale Campus
Iowa City, IA 52242
(319) 353-5789

CIRCLE READER SERVICE NO. **545**

NEW

How to run AppleII programs on the Macintosh.™



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NEW

CIRCLE 170 ON READER SERVICE CARD

Pipeline

II SERIES

LOCKSMITH, VERSION 6.0

The copy program Locksmith is now available in a version that provides a complete disk-utility system, allowing Apple computer users to recover crashed disks, restore accidentally deleted files, and perform hardware diagnostics on disk drives and memory boards. Version 6.0 includes an advanced disk-recovery utility, a framing-bit analyzer, an automatic boot tracer, a sector editor, file utilities, and a powerful bit-copy program. The package includes a library disk that contains automatic procedures for copying Apple programs. *(List Price: $79.95; upgrade from Version 5.0, $29.95)*

Requires: Apple II, II Plus, IIe, or IIc; 48K RAM; one disk drive

Alpha Logic Business Systems
4119 North Union Road
Woodstock, IL 60098
(815) 568-5166

CIRCLE READER SERVICE NO. **510**

MAC II SERIES

UNIVERSE II

A science-fiction adventure game, Universe II is a sequel to Omnitrend's Universe. The game is set in the 24th century and concerns the government of a group of planets located in a star cluster called the Local Group. The Local Group's government is at odds with a nearby government. You must carry out missions for the Local Group's government, but as you are a free agent, you must earn your own way, which involves you in trading, mining, and perhaps piracy. The game includes 47 detailed planets, 98 starship parts, intelligent enemy ships, and an entire ship's crew. *(List Price: $69.95)*

Requires: Macintosh or Macintosh XL, 512K RAM; Apple IIc with two disk drives; or IIe, 128K RAM, 80-column board, and two disk drives

Omnitrend Software, Inc.
P.O. Box 3
West Simsbury, CT 06092
(203) 658-6917

CIRCLE READER SERVICE NO. **515**

II SERIES

ECHO PLUS

The copy program Echo Plus can copy almost all disk-based software for Apple II computers and does not require users to supply parameters. Its Automatic Disk Copier feature enables users to copy even those disks whose protection scheme is unknown, and for experienced users, the program includes a powerful track editor with a 28K track buffer. The program also displays the precise drive speed, checks the disk drive's alignment, checks the disk surface for physical damage, and erases selected tracks. *(List Price: $59.95)*

COPY II MAC™

- **BACKS UP PROTECTED SOFTWARE!**
  Copy II Mac does more than just sector copy. Its bit copy program has the built-in power and flexibility to handle most protection schemes* *automatically!*
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System Requirements: 128K Macintosh, 1 drive.
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Backup utilities also available for the IBM, Apple and Commodore 64!

These products are provided for the purpose of enabling you to make archival copies only.

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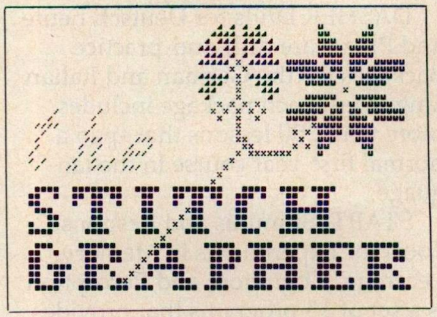

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Disk plus informative 75 page manual -**$89.95.**

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RFD 2 Box 216, Lincoln, MA 01773
(617) 259-0409

Requires: Apple II, II Plus, IIe, or IIc; 48K RAM; DOS 3.3; one disk drive
Agranat Systems
10 Winthrop Circle
Weston, MA 02193
(518) 266-8718
CIRCLE READER SERVICE NO. **528**

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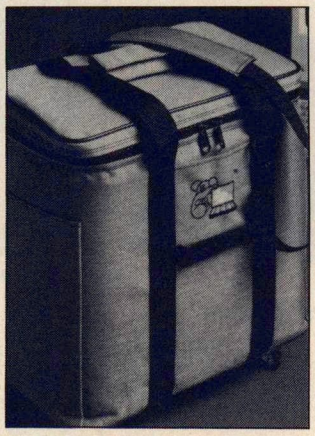

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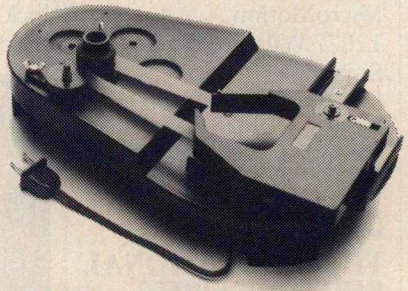

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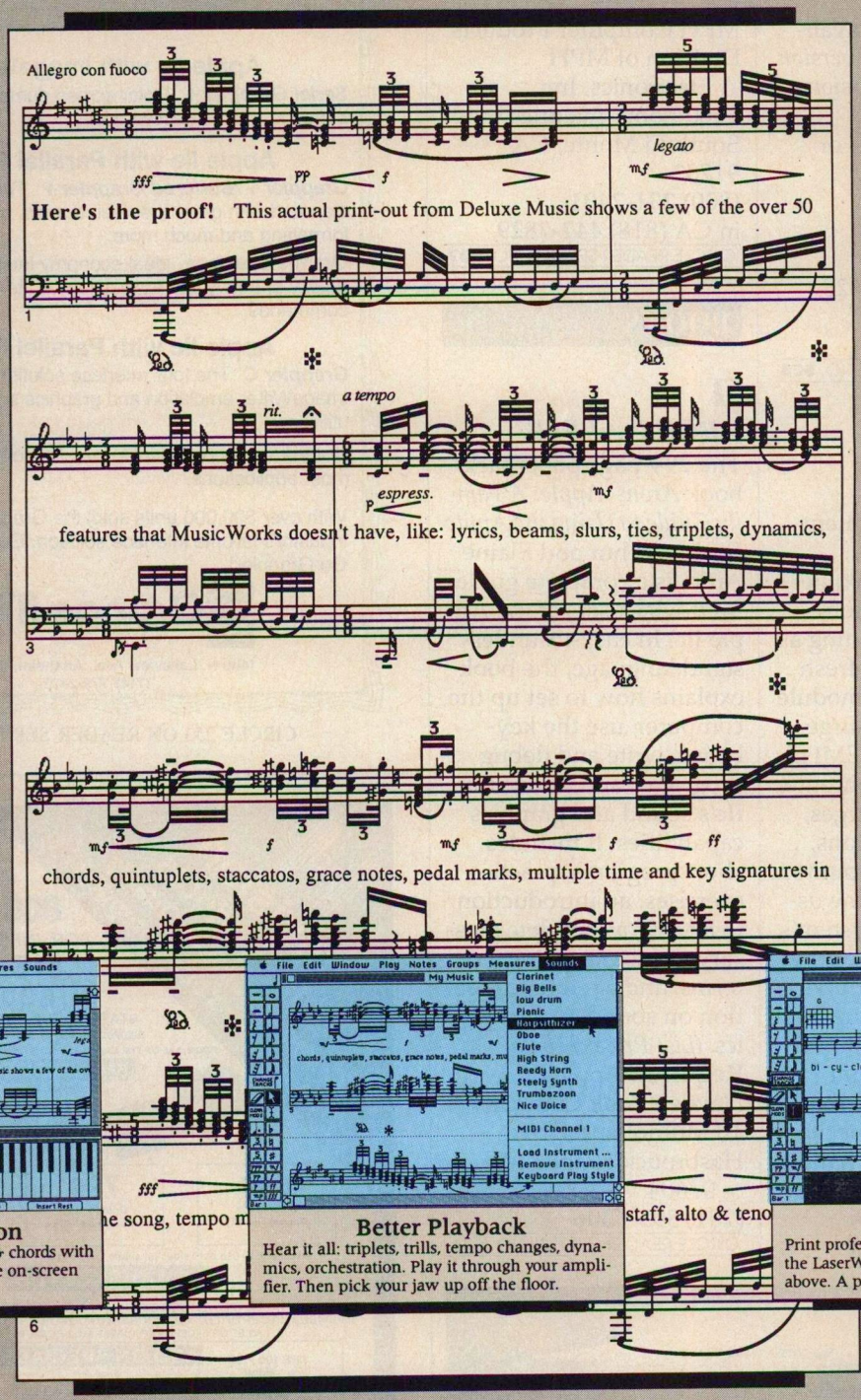

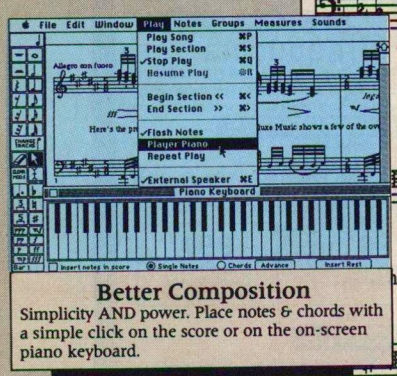

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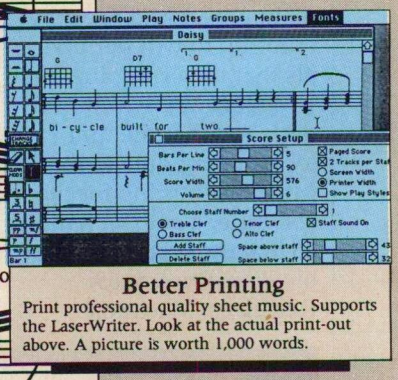

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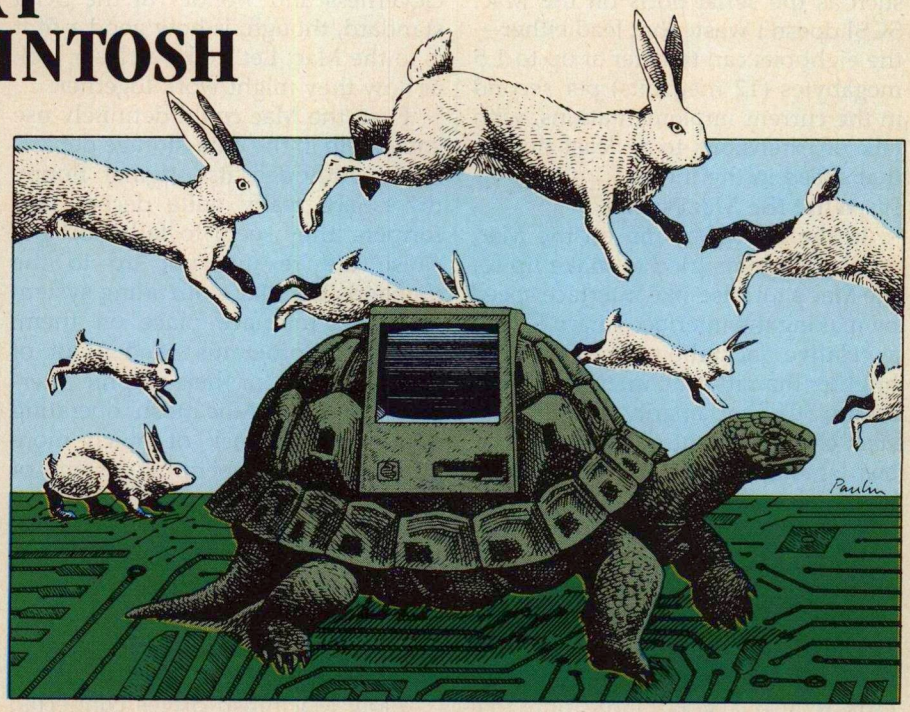
BY STEVE ROSENTHAL

SCUZZY IS SEXY FOR THE MACINTOSH

Rumor has it that the Mac may get a new hard-disk interface.



Suppose Apple came to you and said, "We want you to improve the performance of the Macintosh, make it more accessible to third-party hardware, keep open the possibility of more compatibility with both the Apple II and the IBM PC, and provide for future expansion—and, by the way, you have to have it done real soon and without a major retooling of the physical design."

That's a pretty tough set of requirements, but then Apple needs wizard-class solutions to keep in the forefront of an increasingly competitive market. If you look in your engineer's bag of magic tricks under performance, standards, and minimal physical disruption, you might find that one of the choices is SCSI.

SCSI, which stands for Small Computer Systems Interface, is a way of connecting computers to peripheral controllers, which doesn't sound very exciting at all. Based primarily on its spelling and not its characteristics, it's even commonly pronounced *scuzzy*. But if you'll stick with me for a few minutes, I'll tell you why I think SCSI is good news for us, Apple, and the future of personal computing.

SCSI interfaces have been available for the Apple II and IBM PC for a while, and one third-party developer in the San Francisco Bay Area installs a SCSI interface for a hard disk on Macintoshes as a custom modification. Rumors have been going around recently that Apple is planning to provide a SCSI-interface option for the Macintosh sometime soon, but for the record, let me first note that when I wrote this column, Apple had made no announcement of any particular Macintosh improvements. A lot of Macintosh ideas and even prototypes go no further than the conjecture stage. I'm betting, however, that Apple will go with SCSI sometime soon because, as I hope you'll soon agree,

SCSI could turn the smart but tortoise-like Mac into a high-performance jackrabbit.

SCSI has what it takes to bring the promise of the Macintosh a big step further along.

SCSI's Fast and Flexible

SCSI isn't an Apple invention, although an Apple adoption could play an important role in popularizing it in the personal-computer market. SCSI started its life as the more euphonically named SASI, or Shugart Associates System Interface, a way the then-premier maker of disk drives devised for connecting up some of the first hard disks intended for use with microcomputers.

After some tweaks and clarifications and a change in name to make it more acceptable to competitors, SASI was taken on and adopted as SCSI by ANSI (one of the industry's standard-setting bodies). In ANSI's numbering system, SCSI became X3T9.2.

In interface parlance, SCSI is a "system level" interface, rather than a "device level" standard. As such, it defines a set of signals and signal lines running between a "host" (a computer) and a controller.

The controller then talks to its attached peripheral over a bus or direct connection, such as over the ST 506/ST 512 interface used for most desktop-class hard disks. A single controller can link up with multiple disk drives, usually two or four.

SCSI is a true bus, rather than just

DOUG PAULIN

a computer-to-controller connection. Up to eight devices can share a single SCSI connection, including any combination of hosts and controllers. In other words, using SCSI, one computer can command seven controllers, seven computers can share one controller, four computers can share four controllers, and so on.

SCSI is also fast. It uses an eight-bit parallel data connection, which potentially gives it a factor-of-8 head start over serial-only connections such as the serial ports on the Mac. SCSI doesn't waste that lead either—the eight bits can transfer at up to 1.5 megabytes (12 megabits) per second in the current implementations, with talk of extensions to at least double that speed in the future.

It's What the Mac Needs

In the first go-round on the Mac, Apple designers tried to make up for the Mac's tortoise-like interface speed by making the interface smart. SCSI's a relative jackrabbit, and it's also brighter than its Mac-interface predecessor. SCSI has a parity line for data-error checking, control lines to enable bus sharing, and direction-control lines to let messages pass both ways over the data bus without colliding.

Last, SCSI is flexible. Although originally designed only for Winchester-style hard-disk drives, SCSI has been extended to other disk drives, and even printers. The success of the efforts is also a good indication that SCSI will probably be able to handle future so-far-undefined devices.

More relevant than the abstract cleverness and wonder of the SCSI standard is how good a fit it is to the Mac.

More relevant than the abstract cleverness and wonder of the SCSI standard, though, is how good a fit it is to the Mac. Let's take a closer look at how they might work together.

First, the Mac could definitely use some help in the data-storage department. Although its original floppy drives are really quite decent performers, they seem to fall short because they're just not up to the demands the Mac's operating system and user interface place on them. Macintosh programs need a lot of program code for their graphic interfaces, and the Macintosh operating system keeps track of much more data than do the operating systems of some of its competitors.

Hard disks are a great help, but they haven't been easy on the Mac. The Mac's designers didn't make explicit provision for hard disks, leaving designers to choose between several suboptimal solutions.

Early Macintosh drives connected to the serial port, but the port is too underpowered for fast data transfers, and these drives had only limited success. Furthermore, in most cases, connecting a hard disk either uses up one of the two Mac ports or at least places restrictions on serial operation.

General Computer Company's Hyperdrive avoids the serial bottleneck because it mounts inside the Mac, and it's a gem of a performer (see "Thoughtware," March 1985, pages 15–20, and "20/20" on pages 124–131 of this issue), but it's pricey and difficult to upgrade or replace.

Quark's QC-10 and Apple's original Macintosh Hard Disk 20 took a middle path, using the floppy-disk-drive port instead of the serial connection, but data-transfer speed is still limited by this method.

If you're willing to put up with some of these limitations and go ahead with a hard disk, you'll find one more important restriction: Because the original Mac didn't support a hard disk, it also failed to supply a way to back up hard-disk information. If you're serious about using a hard disk, particularly for business or serious programming, you know that it is necessary to make a copy of your data on some removable medium in case of a mistake by you, the software, or the hardware.

If you back up a 20-megabyte hard disk to floppies, you'll need about 50 of the single-sided variety. The elapsed time for the operation is close to an hour, and you have to sit there and feed in disks. Most people I know with Mac hard disks consequently

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CIRCLE 155 ON READER SERVICE CARD

don't back them up as often as they should to protect their data.

SCSI Gives You Options

Now, if you had a SCSI interface, you'd have some other attractive options. You could buy SCSI controllers off the shelf that use various popular industry-standard interfaces on the disk end of the connection, meaning that you could hook up a Mac to a disk that was just as fast as the one on IBM's PC AT and get your Macintosh really cruising.

You wouldn't even have to stop at AT speed. Because SCSI can transfer data so quickly, you could even move up to some of the faster minicomputer drives and those of a few supermicros that run at a ten-megabit-per-second rate, which is double the speed of the current personal-computer standard.

SCSI controllers and drives should also be economical. Because several SCSI-controller chip sets have been developed, the price for a basic SCSI controller is already below $200 and still falling. Since SCSI is a generic solution rather than an Apple-specific one, the cost of development is spread out over many more customers, so the price of the controller can be lower.

SCSI controllers use industry-standard disk drives, so the cost on the disk-drive end should also be low. Hard-disk drives are now becoming commodity items, which will drive the cost of popular models far below the price for more unusual and specialized adaptations.

A SCSI interface would also loosen the ties between the Macintosh and a disk drive, making upgrades easier. Right now, Apple is in a bit of a bind when it comes to making Mac hardware upgrades in general, because the cost of enhancements is often punitive for owners of the original versions. That's not good for us, and it's not good for Apple either.

Getting the disk drive and controller out of the Mac box would, of course, make it easier to make upgrades on the mechanical and electrical level. In addition, the more standardized a peripheral, the more likely it can be used on another machine if you upgrade yours, which makes upgrades easier to accept.

A looser coupling also allows more room for change and improvement. If, as appears likely, we'll have affordable solid-state external RAMdisks in the next few years, they will be fairly easy to hook up with a SCSI controller.

Apple is rumored to be working on several optical-disk and video-interface projects.

You can also hook up a tape drive with an SCSI interface, either for on-line data storage or for backup. You may be interested in the first use only if you're performing some kind of data-collection and logging application, but facilitating hard-disk backup is usually a worthwhile investment. Furthermore, if you have to send 60 megabytes of data across town or across the country, you're better off with a tape than with a large box of floppy disks.

An even more important implication for Apple's plans is that you can hook optical disks to a SCSI bus. Ap-

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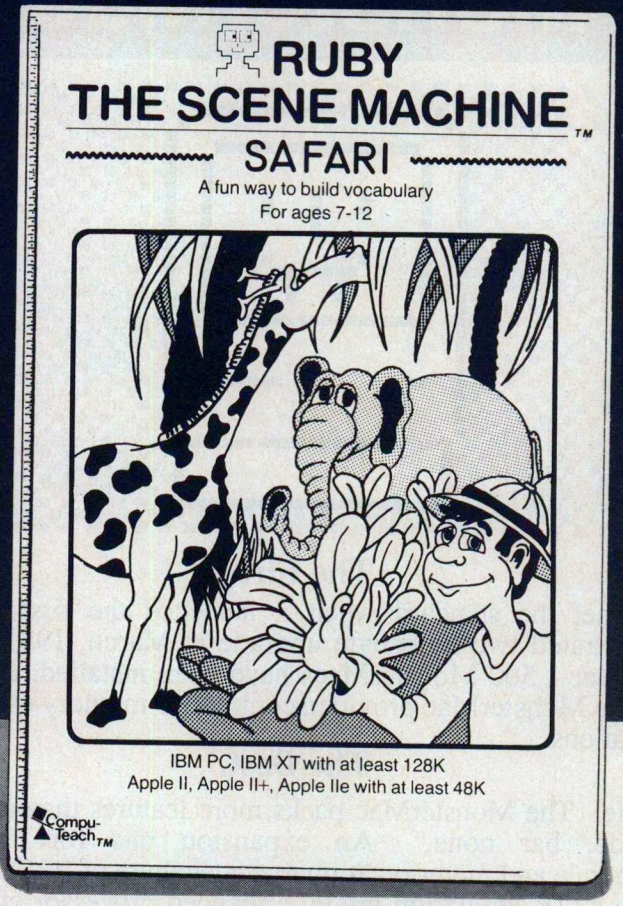

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CIRCLE 308 ON READER SERVICE CARD

ple is widely rumored to be working on several optical-disk and video-interface projects, none of which have been announced as of this writing. Given the Mac's voracious appetite for code and data, an optical disk would make very good sense indeed.

Apple's competitors, furthermore, seem to have optical disks in the works. Atari has promised a CD-ROM-style optical-disk player for its ST ("Jackintosh") computer, and several independents already have developed interfaces for CD-ROM players for the IBM PC. I believe an optical-disk connection will soon be a market necessity, a position that I will explain at more length in this column next month.

I believe an optical-disk connection will soon be a market necessity.

A SCSI connection needn't be seen exclusively as a more efficient path to storage for the same applications we're currently running on Macs. Because SCSI is a multiported bus, it opens up some interesting Mac possibilities.

The demise of the Lisa last year left Apple Computer with no entry in the multiprocessing segment of the market and no rapid way of sharing data among machines. SCSI could help out here as well.

Along with having speed, error-checking abilities, and flexibility, SCSI interfaces are deliberately polite and cooperative. The SCSI standard includes Disconnect and Reconnect features that tell controllers or hosts to release the use of the SCSI bus while the controller is waiting for an electromechanical disk operation. Because a drive typically spends most of its time on mechanical movements and a smaller proportion on actual data transfer, one SCSI bus can keep up with several controllers, particularly ones handling different tasks.

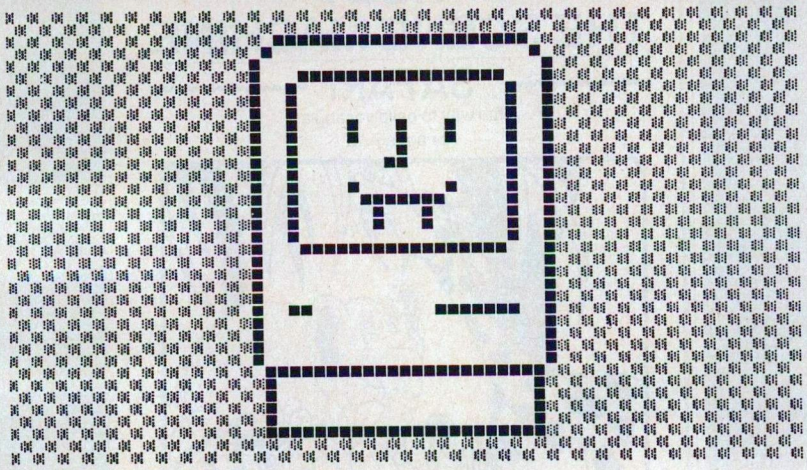
If you stretch your imagination a bit, you can see that these multiple controllers don't all have to be storage devices. Perhaps you'd like to put a specialized string-searcher coprocessor on the Mac, or a color-video card, or a robot arm. With the SCSI interface, we'd have the kind of "virtual slot" that Apple hoped to provide for the IIc and the Mac. Only, in this case, with the higher data rate, more standardized interface, and parallel path, the concept would have a better chance of attaining popularity.

The SCSI structure allows up to seven machines to share one peripheral, in effect creating the hardware basis for a high-speed multiprocessor machine. If someone writes the software, we'll have another alternative for work-group data sharing that will be lightning fast and easy to connect.

The possibilities, it seems to me, are exciting. A SCSI interface would do a lot to strengthen the Mac, both in performance and in depth and breadth of applications. It would, in that case, deserve the pronunciation that seems to have lost out in the engineering world—they call it scuzzy, but for the Macintosh, it is a sexy interface indeed. +

Contributing Editor Steve Rosenthal, for his part, certainly wouldn't want to be known as scuzzy, regardless of whether he deserved the alternative.

Levco MonsterMac



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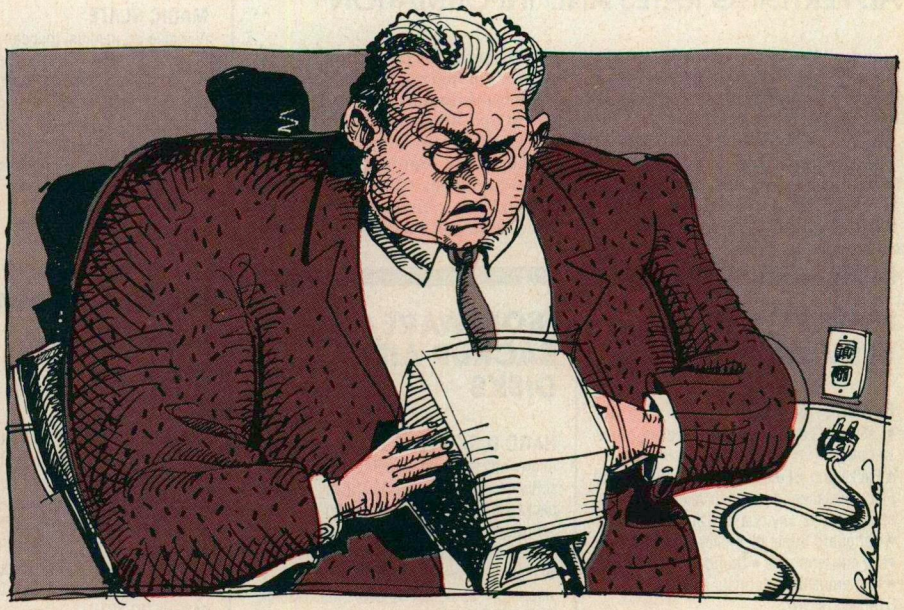
Rescue Squad

BY GREG MAINIS



EIGHTY COLUMNS ON SCREEN AND PAPER

Q. *My AppleWorks word-processing screen is only 80 columns wide, and I own a 15-inch ImageWriter printer, which means that I do not have "what you see on the screen is what you get on the paper." What can I do about this?*

A. Currently, you cannot display the same text format on the screen with an 80-column card as you can print on a 15-inch-wide printer. Videx is modifying its UltraTerm product to work with AppleWorks, however. By using an AppleWorks modifier program with UltraTerm, you will be able to view up to 160 columns by 24 lines or 128 columns by 32 lines. This product is still under development, and a Videx spokesperson tells me that AppleWorks is now working in the 128 × 32 mode. The Videx modifier will operate on AppleWorks Versions 1.1., 1.2, and the soon-to-be released 1.3. The ability to preview more than 80 columns will depend on the type of monitor you are using. Videx recommends a high-persistence phosphor monitor, such as the Apple Monitor III.

CHARACTER PITCH WITH APPLE WRITER

Q. *I have an Apple IIc computer with an ImageWriter printer and Apple Writer II, Version 2. With the margins set to Apple's defaults, my document prints both left and right margins correctly. When I change my character pitch to 12 or 17 characters per inch, though, the right margin is never correct. The problem does not exist when I use the AppleWorks word-processing program. What am I doing wrong?*

A. There is nothing wrong with either program, and you are not doing anything wrong. You're just leaving out one step. Apple Writer interprets margins by characters per inch. At 10 characters per inch (cpi) you can print 80 (8 inches × 10 cpi = 80) characters across eight inches of paper and 136 (8 inches × 17 cpi = 136) characters at 17 characters per inch. To leave a one-inch right-hand margin at 10 cpi, you set the right margin to 70 (80–10 = 70), but at 17 cpi you need to change the right margin to 119 (136–17 = 119). You need to readjust your right-hand margin whenever you change character pitch.

The word-processing program in AppleWorks works differently than Apple Writer does. Apple Writer uses character measurements, whereas AppleWorks uses inch measurements to determine margin adjustments. Therefore, when you change the character pitch in AppleWorks, your margins are unaffected.

THE CONVERT UTILITY ON A SINGLEDRIVE IIe

Q. *After using ProDOS for four months on my single-drive IIe system, I still can't use the Convert utility to transfer programs and files from my DOS 3.3 disks to my ProDOS disks. Every time I try, I get the message* Error: No room on volume. *What am I doing wrong?*

A. You're really not doing anything wrong; it's just that Convert was written for a two-drive system. (This problem isn't a first for Apple: When DOS 3.2 first came out, the standard disk-copying program worked only if you had two drives!) After you insert your DOS 3.3 disk and specify the name of the file to be converted, Convert dutifully loads it into memory and then tries to save it to the ProDOS destination disk, which, of course, is not in the drive. Instead of asking you to insert the ProDOS disk when it doesn't find it, Convert displays its misleading error message.

You can avoid this problem if you are using a 128K IIe or IIc. In this case, use Convert's P command to set the prefix of the destination disk to /RAM. This is the name of the RAMdisk volume that ProDOS sets up in the auxiliary-memory area of the extended 80-column text card. Now when you convert a DOS 3.3 file, it will be saved in /RAM. You can then exit from Convert and use the ProDOS Filer program to transfer the file from /RAM to a real ProDOS disk. ✚

Please send your questions and problems to Rescue Squad, A+, 11 Davis Drive, Belmont, CA 94002.

YVONNE BUCHANAN

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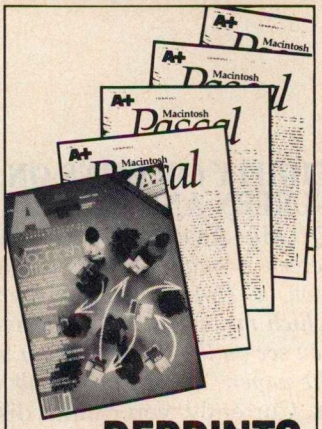

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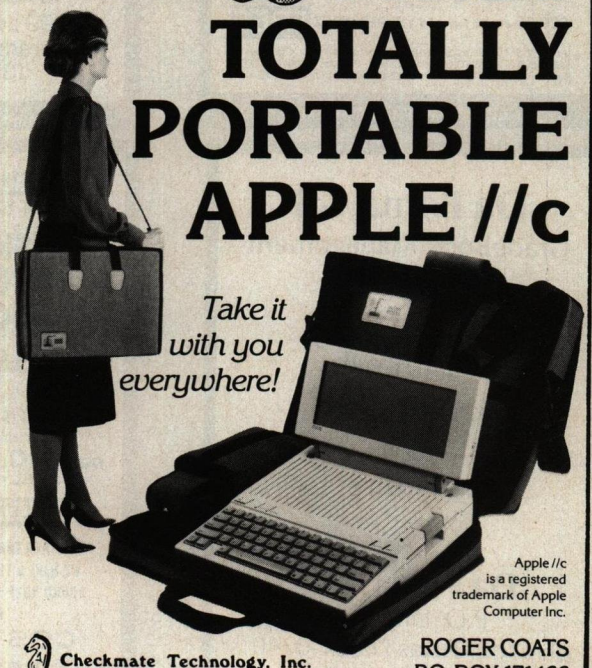

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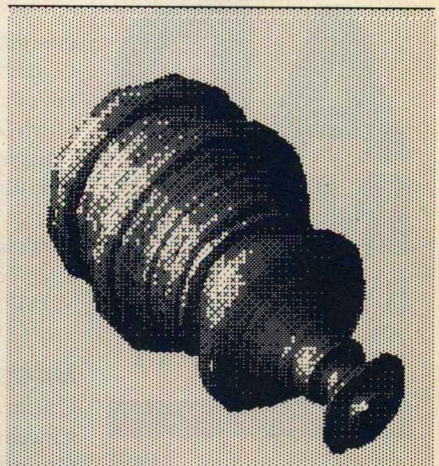

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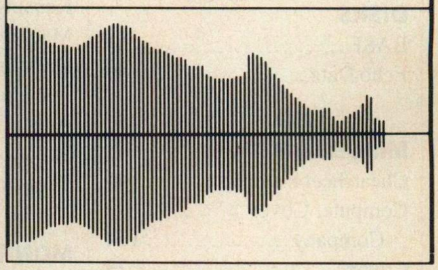

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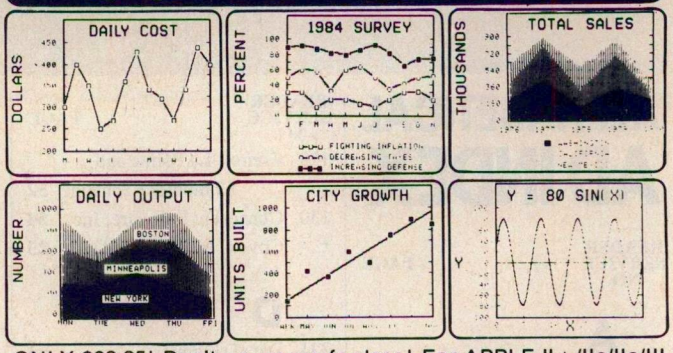

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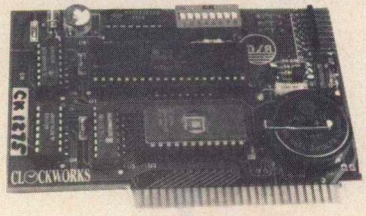

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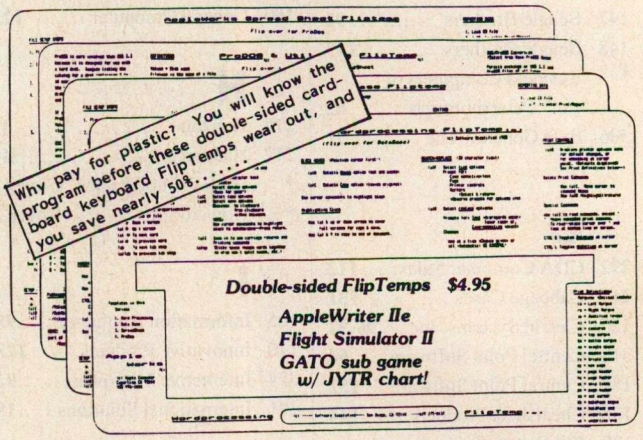

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Apple II+	B	I
Apple *IIe*	C	J
Apple IIc	D	K
Macintosh	E	L
Other (specify)	F	M
None	G	N

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	(3.) Plan to Buy	(4.) 1-3 Months	(5.) 4-6 Months
Printer	O	V	3
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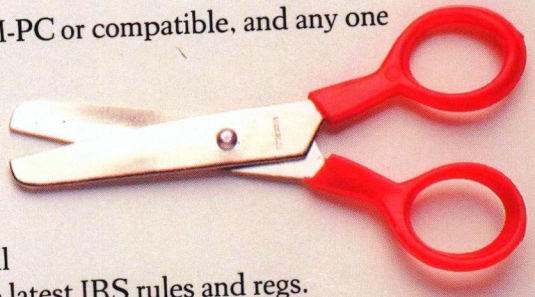

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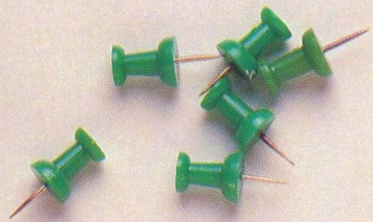

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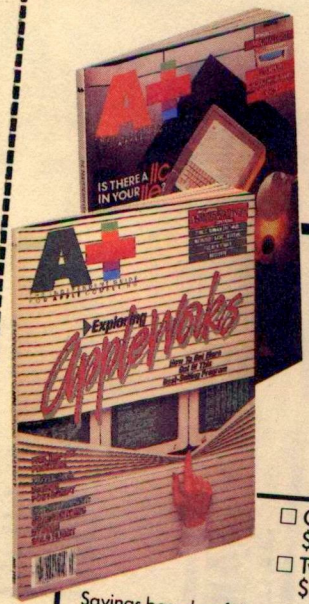

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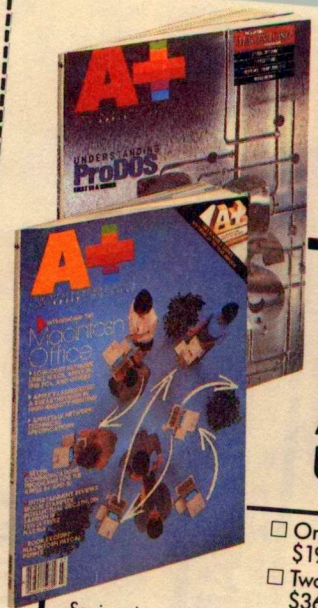

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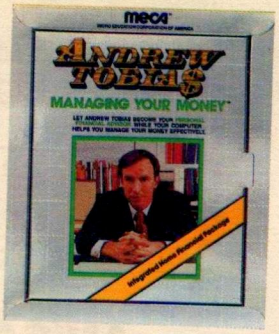

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